

KEY HABITAT Action Plan

**Priority
Problem**

Loss and degradation of key habitat, and past and present fisheries practices, have contributed to declines in salmonids and other aquatic and estuarine associated organisms. Important riparian, instream, large wood, freshwater off-channel, tidal slough, and estuarine habitats have been lost or degraded. Fishery practices include management of natural production, hatcheries, and harvest.

Goal

Assess, Protect, and Enhance Riparian Habitat

Human activities have severely altered or removed riparian vegetation throughout the Watershed. Riparian areas have been modified by forestry practices, fires, agricultural activities, road construction, and/or urban development. Protecting and enhancing riparian habitat to healthy condition along perennial and seasonal streams throughout the Watershed will improve water quality and salmonid habitat, and reduce sediment loading.

Goal

Assess, Protect, and Enhance Instream Habitat

Human activities have severely degraded the quality of instream habitat throughout the Watershed. Critical examples of degraded habitat include loss of habitat structure, reduced woody debris, reduced or altered flows, blocked fish passage, and diverted water. Protecting and enhancing instream habitat will help restore viable populations of salmonids and other aquatic species.

Goal

Assess, Protect, and Enhance Wetland Habitat

Wetlands have been degraded or converted to other uses throughout the floodplain and tidelands. Wetland conversion to agricultural, urban, road, and other land uses has reduced off-channel rearing habitat for salmonids and altered stream flow in the floodplain and tidelands. Protecting and enhancing wetlands will provide habitat for salmonids and diverse aquatic species, help reduce flood and sediment impacts, and improve water quality.

Goal

Assess, Protect, and Enhance Estuary and Tidal Habitats

Large acreages of tidal habitat have been filled, diked and/or drained for various human uses. These activities have significantly reduced rearing habitat for

salmonids, and heavy sediment loads have impacted estuary and floodplain/lowland habitat. Protecting and enhancing estuary and slough habitat will help restore viable populations of salmonids and other species.

Goal Enhance Health of Salmonid, Shellfish, and Other Aquatic Species Stocks

Past and present fishery practices have contributed to the declines of salmonids and other aquatic species. While protecting and enhancing habitat will help stocks recover, fishery practices should also be carefully evaluated and modified as needed to enhance estuarine and marine commercial and sport fisheries.

Objectives Enhance 200 miles* of forested riparian habitat to healthy riparian condition by 2010.

Enhance 500 miles of riparian habitat in the 0–500' elevation band to healthy condition by 2010.

Enhance 100 miles of upland instream habitat by 2010.

Enhance 100 acres of freshwater wetland by 2010.

Upgrade 50% of all tide gates by 2010.

Enhance 750 acres of tidal wetland by 2010.

No net decline in eelgrass beds.

Achieve Oregon Department of Fish and Wildlife (ODFW) wild fish production and escapement goals by 2010.**

* Note: Miles of riparian habitat refers only to the side of the stream being enhanced

**ODFW included production and escapement goals for coho and chum salmon, described in the table and text below, in its Oregon Coastal Salmon Restoration Initiative plan.

Table 4-1: Estimate of coho salmon production potential and spawner needs for Tillamook Watershed.

Spawner Escapement Goal	Marine Survival Rate of Brood	Production Potential			
		Spawning Habitat Quality Utilization			Total Return (Recruitment)
		High	Moderate	Poor	
17,100	10%	8,100	8,500	16,400	33,000
5,700	5%	4,000	4,300		8,300
2,000	3%	2,400			2,400

Note: Tillamook Bay, primarily the Kilchis and Miami rivers, hosts Oregon’s largest population of **chum** salmon. The largest number of chum harvested the Bay was 264,570 in 1928 (Oakley 1962). If the catch represented 40.7% of the total population, similar to estimates derived for the fishery after the late 1940’s, then since the 1960s the maximum estimated run has peaked at only 47,000 (or about 7% of the historic peak run into the Bay). Current evidence indicates that the potential maximum run of chum salmon is about 47,000 fish in Tillamook Bay with existing environmental conditions. Recruitment (return) of chum salmon by brood year (ages 3 through 5 combined in successive years of returns) has ranged between 2,608 (1957 brood year) and 34,729 (1970 brood year) where estimates of the age composition of the run were available.

Key Habitat Action Plan

Riparian, Instream, and Wetland Habitat

- HAB - 01 Characterize Riparian and Instream Habitat
- HAB - 02 Assess and Map Riparian and Wetland Habitat
- HAB - 03 Prioritize Upland Protection and Enhancement Sites
- HAB - 04 Prioritize Floodplain/Lowland Protection and Enhancement Sites
- HAB - 05 Protect and Enhance Upland Riparian Areas
- HAB - 06 Protect and Enhance Lowland Riparian Areas
- HAB - 07 Protect and Enhance Instream Habitat
- HAB - 08 Protect and Enhance Freshwater Wetland Habitat
- HAB - 09 Control Livestock Access to Streams
- HAB - 10 Stabilize Streambanks Using Alternatives to Riprap
- HAB - 11 Encourage Protection and Enhancement on Private Lands
- HAB - 12 Sponsor a Native Vegetation Planting Day
- HAB - 13 Increase Incentive Program Payments
- HAB - 14 Ensure Minimum Streamflows
- HAB - 15 Revise Local Ordinances to Increase Protection of Riparian Areas, Wetlands, and Instream Habitat
- HAB - 16 Effectively Enforce Laws and Regulations

Estuary, Sloughs, and Tidal Marsh

- HAB - 17 Characterize Estuarine and Tidal Habitats
- HAB - 18 Prioritize Tidal Sites for Protection and Enhancement
- HAB - 19 Protect and Enhance Tidal Marsh
- HAB - 20 Protect and Enhance Eelgrass Habitats
- HAB - 21 Remove or Modify Ineffective Tide Gates and Floodplain/Lowland Culverts
- HAB - 22 Enhance Large Wood in Estuary
- HAB - 23 Update the Estuary Plan and Zoning
- HAB - 24 Reconnect Sloughs and Rivers to Improve Water Flow
- HAB - 25 Control Burrowing Shrimp Populations
- HAB - 26 Prevent Introduction and Control Exotic Species

Fishery Practices

- HAB - 27 Effectively Enforce Fishing Regulations
- HAB - 28 Evaluate Commercial and Sport-Fishing Practices
- HAB - 29 Implement Essential Fish Habitat Mandates
- HAB - 30 Support the Oregon Plan for Salmon and Watersheds

Streams Surveyed for Aquatic Habitat Characteristics in Tillamook Bay Watershed

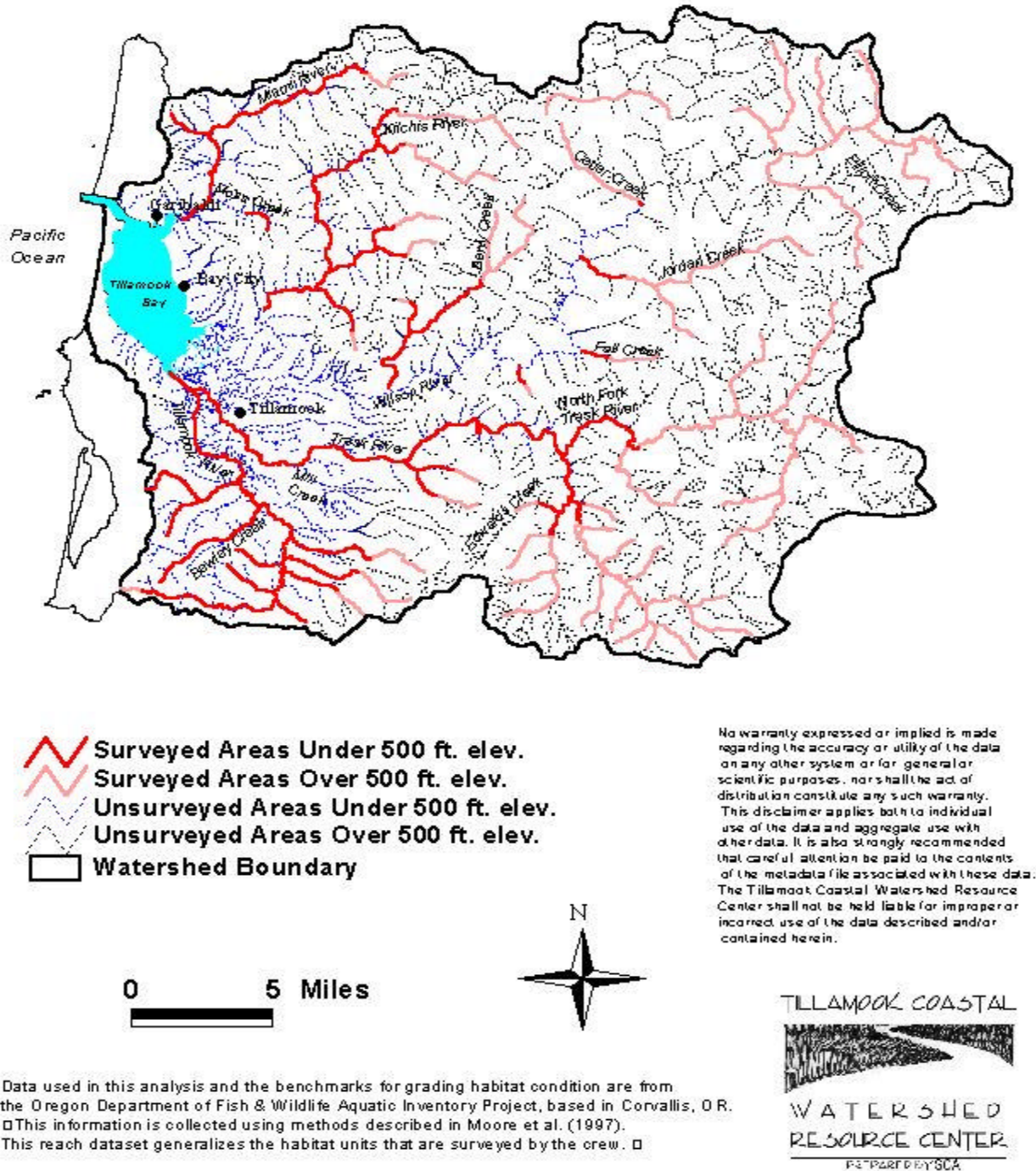


Figure 4-1.

Oregon Plan Core Areas and American Fishery Society Aquatic Diversity Areas in Tillamook Bay Watershed

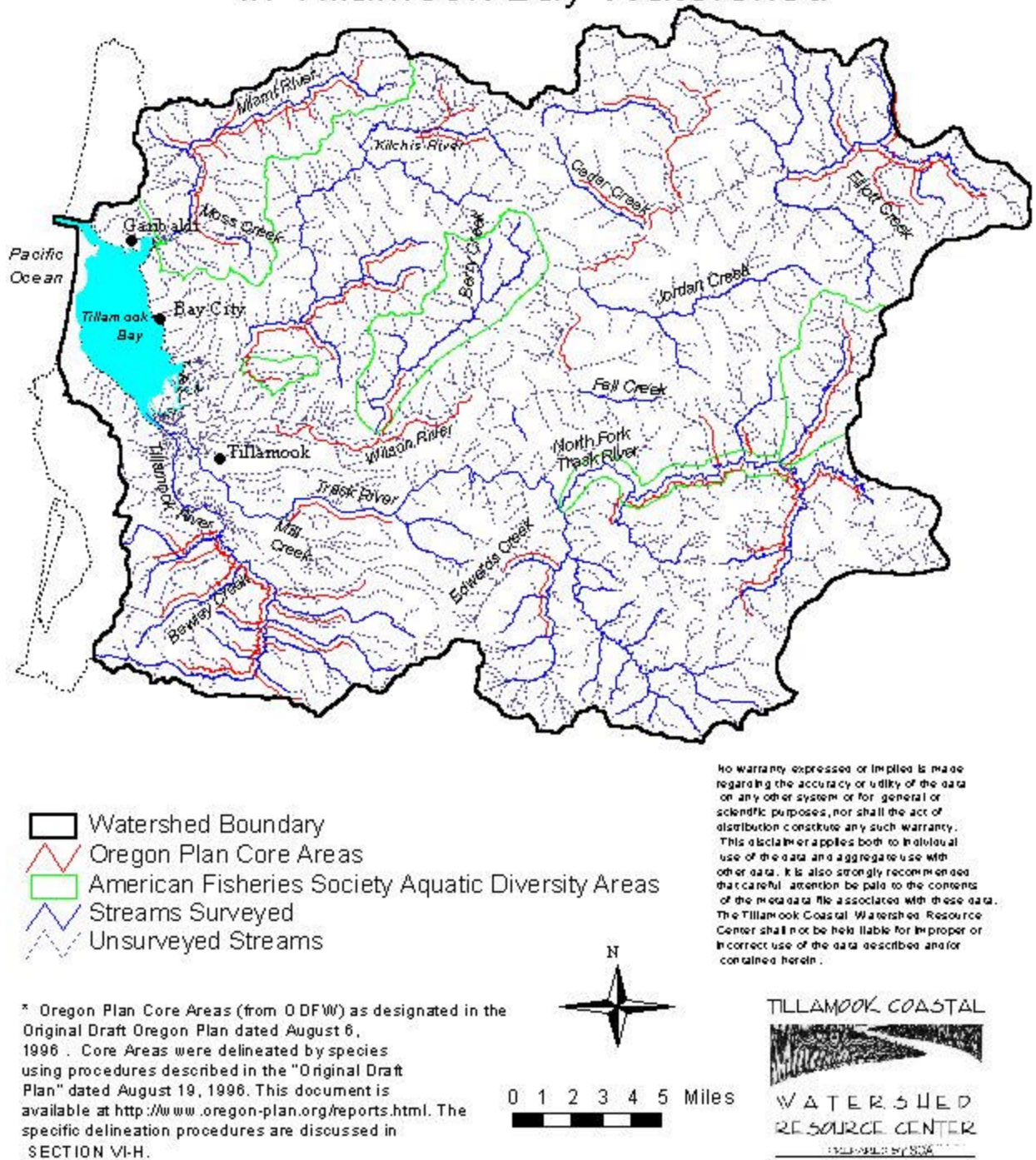


Figure 4-2.

Large Woody Debris Recruitment Potential In Tillamook Bay Watershed

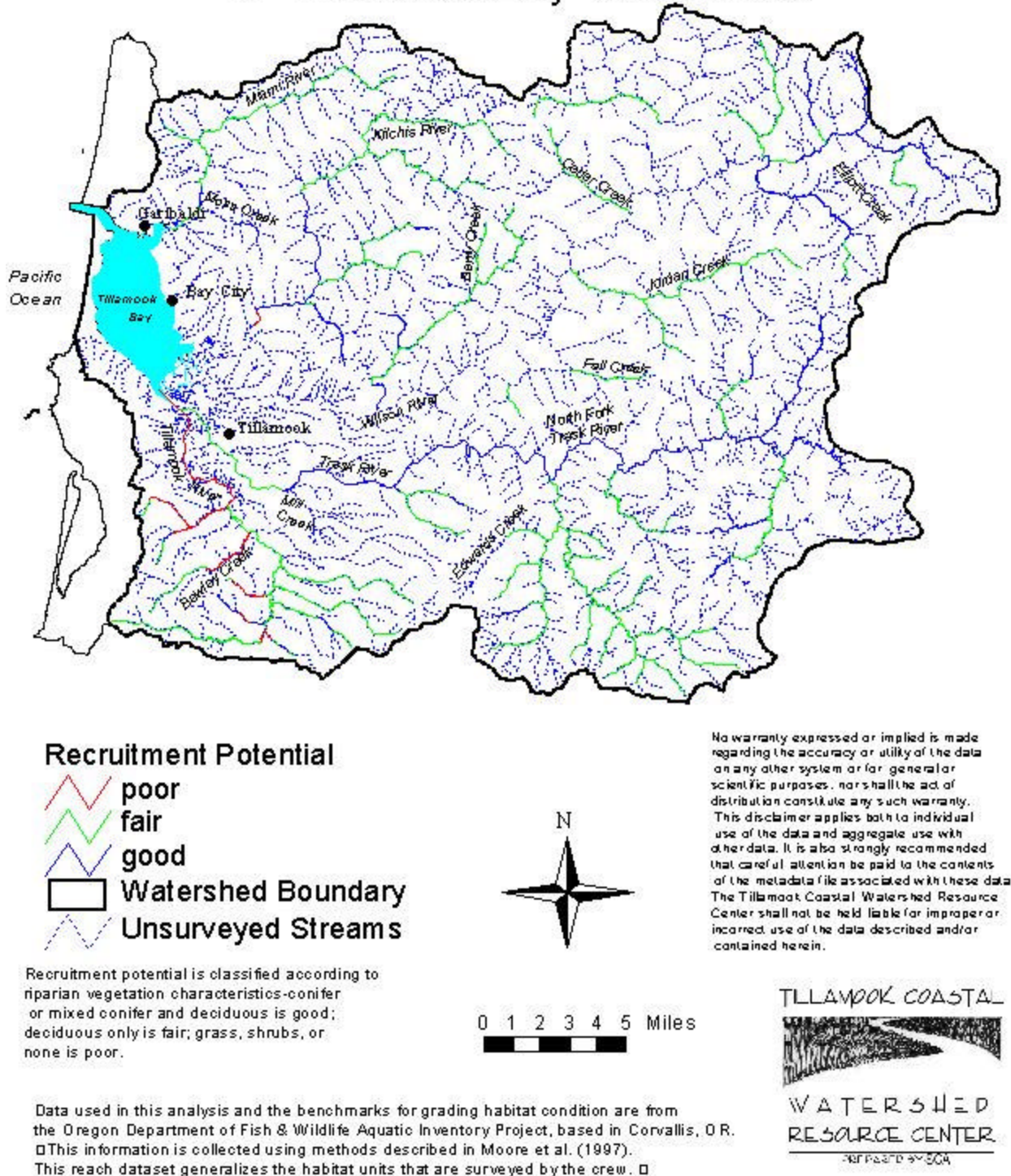


Figure 4-3.

HAB - 01 Characterize Riparian and Instream Habitat

What	Complete ODFW Aquatic Inventory surveys for priority stream reaches. Schedule habitat resurveys based on ODFW guidelines to track trends and monitor progress. Complete Oregon Watershed Enhancement Board (OWEB) watershed assessments for all rivers to help prioritize protection and enhancement opportunities. Maintain all maps, data, and GIS layers in a user-friendly, community information center to support watershed councils.
Why	This information helps agencies and watershed councils identify problems and prioritize sites for protection and enhancement. ODFW Aquatic Inventory surveys provide key habitat information relevant to instream and riparian conditions. Watershed assessments provide a summary of all habitat information and highlight problem areas and/or opportunities for protection and enhancement. Better wetland/riparian maps will help County planners protect valuable areas from development and monitor progress in achieving enhancement targets.
How (Who.* When.**)	<p><i>Step 1</i> Identify priority stream reaches for ODFW Aquatic Inventory surveys. Survey these reaches and update previous surveys in selected areas using ODFW crews. (ODFW. 2000.)</p> <p><i>Step 2</i> Enter survey results in GIS database for use in analysis, site selection, and prioritization. (ODFW. 2000.)</p> <p><i>Step 3</i> Use ODFW <i>North Coast Stream Project Guide to Restoration Site Selection Phase II</i>¹ to identify and prioritize instream protection and enhancement sites (See Appendix G) and help identify upland riparian sites. (Performance Partnership and ODFW. Annually.)</p> <p><i>Step 4</i> Complete watershed assessments or analyses for the Miami, Wilson and Tillamook rivers. Involve citizens from watershed councils to complete the assessments and write action plans. Maintain all results, data, and maps at the Tillamook Coastal Watershed Resource Center. Use the watershed assessment results from all five rivers to identify and prioritize floodplain/lowland and estuary sites. (Performance Partnership and Tillamook Bay Watershed Council. 2001.)</p>
Where	Priority reaches will be surveyed Watershed-wide. Watershed Assessments for the Miami, Wilson, and Tillamook Rivers.
Lead Agencies	ODFW for Aquatic Inventory surveys. Watershed councils for watershed assessment.
Other partners Anticipated Costs	Performance Partnership, BLM, USFS, ODF, private landowners. ODFW Aquatic Inventory surveys: \$1,000–1,500 per mile x 200 miles = \$200,000-\$300,000.

¹ Thom, B., and K. Moore. 1997. North Coast Stream Project. Guide to Instream and Riparian Restoration Sites and Site Selection, Phase II.

* Coordinating entity, ensures that identified partners are on schedule.

**By end of named year.

Data analysis: \$150 per stream mile x 200 miles = \$30,000.
Watershed Assessments: \$25,000-\$40,000 per watershed, \$90,000 total.

Monitoring

ODFW Aquatic Inventory surveys, the basis for monitoring riparian and instream status and trends, will be updated to track CCMP objectives:

- Enhance 200 miles of forested riparian habitat to healthy riparian condition by 2010.
- Enhance 500 miles of riparian habitat in the 0–500' elevation band to healthy condition by 2010.
- Enhance 100 miles of upland instream habitat by 2010.

Regulatory Issues

Land owner permission

Related Actions

- HAB-02 Assess and Map Riparian and Wetland Habitat
- HAB-03 Prioritize Upland Protection and Enhancement Sites
- HAB-04 Prioritize Floodplain/Lowland Protection and Enhancement Sites
- HAB-05 Protect and Enhance Upland Riparian Areas
- HAB-06 Protect and Enhance Lowland Riparian Areas
- HAB-07 Protect and Enhance Instream Habitat
- HAB-09 Control Livestock Access to Streams
- HAB-10 Stabilize Streambanks Using Alternatives to Riprap
- HAB-11 Encourage Protection and Enhancement on Private Lands
- HAB-14 Ensure Minimum Streamflows
- WAQ-01 Define, Implement, and Enforce Pollution Prevention and Control Measures on Agricultural Lands
- WAQ-08 Ensure Adequate Urban Runoff Treatment and Retention
- WAQ-10 Implement Temperature Management Strategies
- WAQ-11 Implement Suspended Sediments Management Strategies
- SED-02 Implement Practices That Will Improve Sediment Storage and Routing
- SED-03 Reduce Risks in Landslide-Prone Areas
- SED-05 Reduce Sedimentation from Non-Forest Management Roads
- FLD-02 Implement Watershed Drainage Modification Projects
- OPSW: DOGAMI-1, 4; C-1
DSL-1, 2, 9, 10, 12, 13, 21, 26, 27;
ODF-4S, 13S, 16S, 24S, 25S, 27S, 32S, 34S, 35S, 50S, 61S, 62S
ODFW-IB2S, IB4
ODOT-1
OPRW-2
WRD-S-11

HAB - 02	Assess and Map Riparian and Wetland Habitat
What	Create a detailed, accurate map of County riparian areas and wetlands based on the Cowardin ² classification system and the COE/DSL delineation technique. Use the map to identify and protect existing wetlands and to locate potential protection and enhancement sites. Cover the entire study area.
Why	An updated riparian and wetland map would be used by County planners to: <ul style="list-style-type: none"> • help comply with wetland inventory obligations under State Land Use Goals 5, 16, and 17; • document riparian and wetland gains and losses associated with regulations and protection and enhancement activities; and • create a standard riparian and wetland GIS database that is compatible with those of other agencies.
How (Who. When.)	<p><i>Step 1</i> Gather existing sources of information on Tillamook Basin riparian areas and wetlands including Federal National Wetland Inventory (NWI) maps and assessments completed by cities, TBNEP GIS layers, etc. (DSL and Tillamook County. By 2000.)</p> <p><i>Step 2</i> Use the Oregon Freshwater Wetland Assessment Manual protocol for areas that have not yet been surveyed and are known to contain wetlands. (DSL and NRCS. By 2001.)</p> <p><i>Step 3</i> Construct GIS layers and associated data base files (DBF) of riparian and wetlands within the Basin. Add these layers to the Tillamook Coastal Watershed Resource Center for access by all interested parties. (TCWRC. By 2002.)</p>
Where	Watershed-wide.
Lead Agencies	DSL and Tillamook County.
Other Partners	NRCS, ODFW, DLCD, Environmental Protection Agency (EPA), COE, USFS, BLM, local governments, watershed councils, private landowners, agencies implementing Jobs in the Woods program.
Anticipated Costs	DSL: Crew of 2 and supervisor: \$36,250 for 3-month project. Construction of GIS layers and DBF \$2,500.

² Cowardin, L., V. Carter, G. Golet, and E. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. FWS/OBS-79/31. U.S. Fish and Wildlife Service. Cowardin *et al.* developed a classification for the inventory of wetlands and deepwater habitats of the United States. Wetlands are defined by plants (hydrophytes), soils (hydric soils), and frequency of flooding.

Monitoring

Track CCMP objectives:

- Enhance 750 acres of tidal wetland by 2010.
- Enhance 100 acres of freshwater wetland by 2010.

Regulatory Issues DSL requirements for protocol.

Related Actions

- HAB-01 Characterize Riparian and Instream Habitat
- HAB-03 Prioritize Upland Protection and Enhancement Sites
- HAB-04 Prioritize Floodplain/Lowland Protection and Enhancement Sites
- HAB-05 Protect and Enhance Upland Riparian Areas
- HAB-06 Protect and Enhance Lowland Riparian Areas
- HAB-08 Protect and Enhance Freshwater Wetland Habitat
- HAB-09 Control Livestock Access to Streams
- HAB-10 Stabilize Streambanks Using Alternatives to Riprap
- HAB-11 Encourage Protection and Enhancement on Private Lands
- HAB-15 Revise Local Ordinances to Increase Protection of Riparian Areas, Wetlands, and Instream Habitat
- WAQ-01 Define, Implement, and Enforce Pollution Prevention and Control Measures on Agricultural Lands
- WAQ-08 Ensure Adequate Urban Runoff Treatment and Retention
- WAQ-10 Implement Temperature Management Strategies
- WAQ-11 Implement Suspended Sediments Management Strategies
- SED-03 Reduce Risks in Landslide-Prone Areas
- FLD-02 Implement Watershed Drainage Modification Projects
- OPSW: DSL-8, 16, 17, 18, 19, 21.
ODF-13S, 24S, 27S, 28S
ODOT-15, 19

HAB - 03 **Prioritize Upland Protection and Enhancement Sites**

What	Identify high priority riparian and instream habitats for protection and/or enhancement. Define criteria to guide protection and enhancement activities and maintain a list of potential sites. Update protection and enhancement criteria and prioritization list yearly.
Why	A prioritized list of protection and enhancement sites simplifies site selection and allows funding agencies to quickly implement projects.
How (Who.When.)	<p>Prioritize riparian and instream enhancement projects to address watershed functions needed to support healthy watersheds, such as water quality, water quantity, improved channel complexity, floodplain interaction, and quality of riparian vegetation.</p> <p><i>Step 1</i> Review current ODFW prioritization list based on “North Coast Stream Project Guide to Restoration Site Selection Phase II” (Thom and Moore, 1997). See “Potential Instream Enhancement Sites” in Appendix G. (Performance Partnership. 1999, ongoing.)</p> <p><i>Step 2</i> Prioritize watersheds, applying an ecosystem approach such as the Bradbury Framework³. Protect intact aquatic ecosystems identified as aquatic diversity areas (Oregon American Fisheries Society [AFS]), key watersheds (Forest Ecosystem Management Team [FEMAT]), and/or core areas (ODFW). See Appendix E, OPSW Key Watersheds and Aquatic Diversity Areas, and Appendix F, OPSW Core Areas. (Performance Partnership. By 2000.)</p> <p><i>Step 3</i> Prioritize additional river reach sites. (ODFW. By 2001.)</p> <p>The ODFW uses selected parameters for instream areas, to prioritize site-selection including:</p> <ul style="list-style-type: none"> • core area, • close proximity to spawning, summer rearing and winter rearing habitats (within several miles), • stream gradient (<5%), • channel width (<12 meters), • valley shape (moderate, not steep or ‘V’ shaped), • water quality (<i>e.g.</i> temperature) (See DEQ temperature monitoring results and 303(d) list), • water supply (adequate in summer),

³ Bradbury *et al.* 1995. *Handbook for Prioritizing Watershed Protection and Restoration to Aid Recovery of Native Salmon*. For example, Willa Nehlsen used the Bradbury approach to identify the Wilson, Trask, and Kilchis Rivers as high priority watershed in her 1997 report, *Prioritizing Watersheds in Oregon for Salmon Restoration*.

- good fish access (no barriers),
- water diversions screened.

For riparian enhancements, additional criteria include:

- debris torrent-impacted streams and
- downstream and downslope of landslide-prone areas.

Where	Prioritize Watershed-wide above 500 feet elevation.
Lead Agency	Performance Partnership
Other Partners	ODFW, USFWS, NMFS, ODF, BLM, USFS, NRCS, SWCD, North Coast Ecosystem Workforce Initiative, watershed councils, DEQ, Tillamook County, landowners.
Anticipated Costs	\$150 per stream mile x 200 miles = \$30,000.
Monitoring	Coordinate with CCMP objectives: <ul style="list-style-type: none">• Enhance 200 miles of forested riparian habitat to healthy riparian condition by 2010.• Enhance 100 miles of upland instream habitat by 2010.
Regulatory Issues	None.
Related Actions	HAB-01 Characterize Riparian and Instream Habitat HAB-02 Assess and Map Riparian and Wetland Habitat HAB-04 Prioritize Floodplain/Lowland Protection and Enhancement Sites HAB-05 Protect and Enhance Upland Riparian Areas HAB-07 Protect and Enhance Instream Habitat WAQ-10 Implement Temperature Management Strategies SED-03 Reduce Risks in Landslide-Prone Areas FLD-02 Implement Watershed Drainage Modification Projects OPSW: ODF-17S, 20S, 34S, 35S DSL-21 USFWS-5

HAB - 04**Prioritize Floodplain/Lowland Protection and Enhancement Sites****What**

Develop and maintain a high priority list of potential habitat protection and enhancement projects in the floodplain/lowland area. Analyze and update the prioritization list each year as part of the Performance Partnership budget cycle.

Initial prioritization will focus on protecting and restoring rearing habitat, which is the weakest link in the coho and chum life cycles. Additional considerations are landowner willingness and socio-economic factors such as the limited availability of farmland.

Why

A prioritized list of protection and enhancement sites simplifies site selection and allows funding agencies to quickly implement projects.

**How
(Who. When.)**

Step 1 Review and maintain current prioritization action list.

(See “Potential Instream Enhancement Sites” in Appendix G.)
(Performance Partnership. 1999.)

Step 2 Apply an ecosystem approach such as the Bradbury Framework^{2,3} (Performance Partnership. 2000.) to:

- prioritize watersheds (Wilson, Kilchis, and Trask rivers represent current high priority watersheds);
- protect OPSW core areas and aquatic diversity areas; and
- enhance connectivity among existing habitats.

Step 3 Prioritize additional sites and river reaches. (ODFW. 2001.) Important criteria for lowland site selection include:

- near existing high quality instream and/or riparian habitat;
- within or immediately adjacent to a 303(d) listed stream reach;
- provides habitat for federal or state listed sensitive species;
- potential habitat or existing core area for salmonids;
- adjacent to functional instream habitat;
- established native riparian trees present;
- planned, active protection in place for adjacent upland areas;
- located on perennial stream;
- Best Management Practices (BMPs) in use on adjacent farmlands;
- landowner committed to riparian habitat improvement; and
- multiple benefits for habitat, water quality, erosion, and flood protection.

Where

Lower rivers and sloughs Watershed-wide.

Lead Agency	Performance Partnership.
Other Partners	ODFW, USFWS, NMFS, ODF, NRCS, SWCD, North Coast Ecosystem Workforce Initiative, watershed councils, DEQ, Tillamook County.
Anticipated Costs	\$150 per mile for additional ODFW assessments x 500 miles = \$75,000.
Monitoring	Implementation monitoring. Track CCMP objectives: <ul style="list-style-type: none">• Enhance 500 miles of riparian habitat in the 0-500' elevation band to healthy riparian condition by 2010.• Enhance 100 acres of freshwater wetland by 2010.• Upgrade 50% of all tide gates by 2010.• Reduce instream temperatures to meet salmonid requirements.• Reduce instream suspended sediments to meet salmonid requirements.
Regulatory Issues	Department of State Lands Fill/Removal Permits. Section 404 of the Clean Water Act regarding fill activities. Tillamook County Land Use Ordinance and Comprehensive Plan.
Related Actions	HAB-01 Characterize Riparian and Instream Habitat HAB-06 Protect and Enhance Lowland Riparian Areas HAB-08 Protect and Enhance Freshwater Wetland Habitat HAB-09 Control Livestock Access to Streams HAB-10 Stabilize Streambanks Using Alternatives to Riprap HAB-11 Encourage Protection and Enhancement on Private Lands HAB-15 Revise Local Ordinances to Increase Protection of Riparian Areas, Wetlands, and Instream Habitat WAQ-01 Define, Implement, and Enforce Pollution Prevention and Control Measures on Agricultural Lands WAQ-08 Ensure Adequate Urban Runoff Treatment and Retention WAQ-10 Implement Temperature Management Strategies WAQ-11 Implement Suspended Sediments Management Strategies SED-03 Reduce Risks in Landslide-Prone Areas FLD-02 Implement Watershed Drainage Modification Projects OPSW: DSL-21

HAB - 05 Protect and Enhance Upland Riparian Areas

What Protect existing high quality upland riparian areas. Diversify the tree species composition of riparian areas located in uplands (above 500 feet elevation) through planting/interplanting of other native riparian species, especially conifers. Increase conifer stocking on historic conifer sites and promote growth of conifers by appropriate management in RMAs. Establish a multi-disciplinary process to plan and evaluate hardwood conversion activities. See “OPSW Plan Actions” in Appendix D.

Implement prioritization list from HAB-03; analyze and update the habitat prioritization list each year as part of the Performance Partnership budget cycle.

Why The presence of conifers in upland riparian stands enables those stands to later supply conifer stems to the stream channel as large wood. ODFW rated large conifer tree stocking in riparian areas “poor” on 94% of the stream miles surveyed. Diversification of the species composition leads to diversity in the organic matter input to the stream, and better quality riparian habitat. While conifer planting may be beneficial in the long run, it is an experimental technique that needs further development, monitoring, and adaptive management.

**How
(Who.When.)** *Step 1* Work to preserve riparian conifers in core areas.⁴ Follow guidelines described in the Oregon Plan (OPSW) for voluntary measures in core areas, including relocating in-unit leave trees to riparian areas during harvest operations to maximize their benefit to salmonids while recognizing operational constraints, other wildlife needs, and specific landowner concerns. Assist with promoting the OPSW restoration guidelines. (ODF and private landowners. Ongoing.)

Step 2 Identify and protect existing high-quality riparian areas in the uplands through strengthened management practices during timber harvest operations, written agreements with landowners, or purchase of easement. (ODF and private landowners. 2000.)

Step 3 Define the need for additional conifer sources at the watershed scale (ODFW and ODF. 2000.):

- Determine how and when conifer plantings would alleviate any shortage of large wood sources in the Watershed.
- Identify near-term effects on water quality.
- Evaluate impacts on other resource goals.
- Determine optimal locations based on core areas, site conditions, and disturbance regime.

⁴ The BLM and USFS are governed by the Northwest Forest Plan, adopted in 1994. It and their Land Use Planning and Management Documents prescribe BMPs to conserve listed species.

Step 4 Design and implement projects to replace alder and other hardwoods with conifers using ODF/ODFW approved methods⁵. (ODF and other landowners. Ongoing.)

Step 5 Continue site monitoring. (ODF. Ongoing.)

Where Watershed-wide above 500 feet elevation.

Lead Agencies ODF, OFIC.

Other Partners ODFW, NMFS, USFWS, BLM, USFS, timber companies, watershed councils, small wood lot owners, DEQ.

Monitoring Track CCMP objective:

- Enhance 200 miles of forested riparian habitat to healthy riparian condition by 2010.

Coordinate with ODF/OPSW monitoring program, including:

- ODF 10S - Forest Practices Monitoring Program
- ODF 11S - Monitoring RMAs under FPA
- ODF 13S - Storms of 1996 Monitoring Project
- ODF 23S - BMP Compliance Audit Program
- ODF 25S - Fish Presence/Absence Surveys

Anticipated Costs Implementation costs: \$16,860 per mile x 200 miles = \$3,372,000.

Regulatory Issues FPA, CWA, ESA.
OWEB and state agency grants for stream restoration projects must be consistent with restoration guidelines developed for the Oregon Plan.

Related Actions

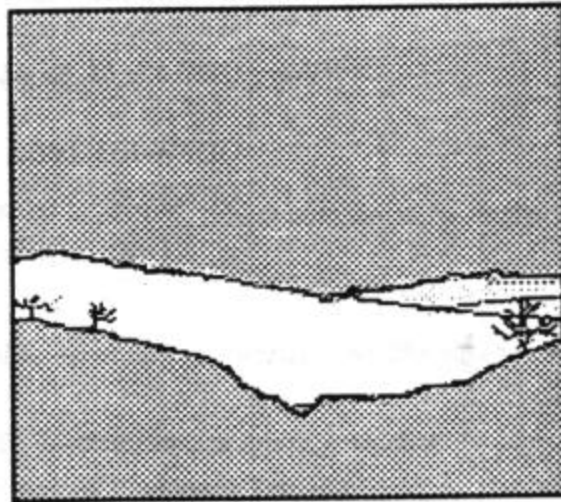
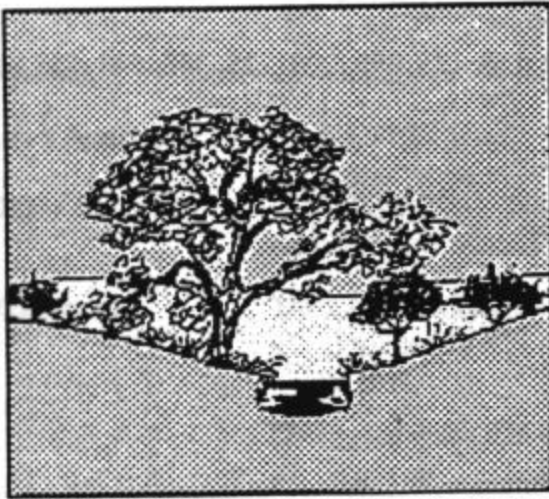
- HAB-01 Characterize Riparian and Instream Habitat
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- HAB-03 Prioritize Upland Protection and Enhancement Sites
- HAB-06 Protect and Enhance Lowland Riparian Areas
- HAB-07 Protect and Enhance Instream Habitat
- WAQ-10 Implement Temperature Management Strategies
- WAQ-11 Implement Suspended Sediments Management Strategies
- SED-03 Reduce Risks in Landslide-Prone Areas

⁵ OPSW Action ODF 8 guidelines limit hardwood conversion to conifer sites where current RMA conifer basal area is less than half of that required by stream size and stream type under the general water protection rules. No more than half of the total stream length within the harvest unit may be converted and the conversion blocks may not exceed 500 feet in width. The conversion blocks must be separated from each other by a minimum of a 200-foot retention block where the general vegetation retention prescription is applied. This management measure includes modifications of applications within Oregon Plan-identified core areas. In lieu of the standard procedures within the rules, hardwood conversions within core areas will be subject to additional review and will require a site specific plan to be submitted and reviewed.

NOTE: Activities on BLM and USFS lands are governed by the Northwest Forest Plan, adopted in 1994.

- SED-04 Ensure Sufficient Resources to Enforce Forest Practices Act
- EDU-01 Develop and Implement an Oregon State University Extension Watershed Masters Series
- OPSW: ODF-5S, 7S, 8S, 10S, 11S, 17S, 19S, 20S, 22S, 33S, 54S, 55S, 61S,
62S
ODFW-IB3, IVB2
OPRD-2

Healthy Versus Unhealthy Riparian Condition



HEALTHY

- ▶ Banks stabilized by tree and shrub roots
- ▶ Abundant vegetation filtering out sediments and pollutants
- ▶ Good shade
- ▶ Cooler water
- ▶ Increased late summer stream flows
- ▶ Better water quality
- ▶ Improved fish habitat
- ▶ High wildlife habitat diversity

UNHEALTHY

- ▶ Few roots to protect and stabilize banks
- ▶ Little vegetation to filter sediments and pollution
- ▶ Eroded banks
- ▶ Little shade
- ▶ Warm water
- ▶ Reduced late summer stream flows
- ▶ Poor water quality
- ▶ Poor fish habitat
- ▶ Low Habitat diversity

Figure 4-4.

HAB - 06**Protect and Enhance Lowland Riparian Areas****What**

Protect existing high quality lowland riparian areas. Enhance lowland/floodplain riparian areas adjacent to streams, rivers, wetlands and other water bodies to a healthy riparian condition (HRC) that supports a number of important ecological functions, including habitat for fish and wildlife.

Healthy riparian areas are characterized by the following conditions:

- **Structure and species composition.** The riparian area supports a diverse plant community in two or more layers (trees, shrubs/groundcover) dominated by native species (See list, Appendix N) suited to the particular site. Where conditions are suitable, native conifers are the dominant tree species. Understory vegetation is dominated by native species characteristic of the area.
- **Vegetative cover.** Vegetative cover within the riparian area is at least 90%, with no more than 10% in bare soil or impervious surface.
- **Width.** The width of the riparian area is sufficient to fulfill the purposes of management for Healthy Riparian Condition (see below). Determination of the appropriate width will be made by qualified agency personnel in consultation with the land owner. Minimum widths will vary, depending on site-specific conditions and the requirements of applicable funding and regulatory programs.
- **Stream shading.** The active channel is at least 75% shaded⁶ when deciduous trees have leaves.
- **Floodplain connectivity.** The stream and floodplain are actively connected, with overbank flows during a 22-year flood event.
- **Bank stability.** Streambanks are stable during a two-year flow event without the use of rip-rap or other artificial structure. Streambanks show little or no change in bank gradient in 2-year flow events, or within two seasons of normal flow events.

Why

Streamside areas in Healthy Riparian Condition, serving the following management purposes:

- create shade to reduce instream water temperatures;
- produce woody debris and detritus (small sticks, leaves, and such) that contribute to habitat values for fish and wildlife;
- filter out excess sediments and organic material, as well as pesticides and other pollutants in surface runoff;
- stabilize the streambank.

⁶ Site method, or as needed to meet TMDL, water quality requirements.

How (Who.When.)	<p><i>Step 1</i> Identify existing and/or potential high-quality riparian areas in the floodplain as described in HAB-01 and HAB-04. (ODFW and Performance Partnership. By 2000.)</p> <p><i>Step 2</i> Protect high quality areas with voluntary agreements, easements, or outright purchase. (Performance Partnership and OWJV. Ongoing.)</p> <p><i>Step 3</i> Deliver an educational program to landowners and interested members of the public. Assist with promoting the OPSW restoration guidelines. Develop maps and brochures about projects being planned or implemented. (SWCD, NRCS, ODA. By 2000.)</p> <p><i>Step 4</i> Implement highest priority projects, but work with willing landowners whenever possible. Plantings should average 50 miles per year, with 250 miles by 2005. (SWCD, NRCS. Complete 500 miles by 2010.)</p> <p><i>Step 5</i> Monitor the project before and after planting. Use citizen monitoring and photo documentation. (NRCS, SWCD. Ongoing.)</p>
Where	Watershed-wide up to 500 feet elevation.
Lead Agencies	NRCS, SWCD, and ODA.
Other Partners	DSL, Tillamook County Planning Department, watershed councils, ODFW, USFWS, ODF, DEQ, Oregon Wetlands Joint Venture.
Anticipated Costs	Enhancement costs per foot of riparian area average: \$1.45 for fencing, \$0.35–\$0.60 for tree planting, \$0.32 for water line and off-stream watering, \$0.12 for design, and \$0.256–\$0.852 for land costs. Costs depend on width of buffer: 15’ buffer = total of 900 acres; 50’ buffer = 3,000 acres (source: SWCD). Total Costs: \$6,589,000-\$8,823,000. Protection costs: site-specific for land, other from above as needed.
Monitoring	Conduct aerial survey every 5 years. Implement field surveys. Track CCMP objective: <ul style="list-style-type: none">• Enhance 500 miles of riparian habitat in the 0–500’ elevation band to healthy condition by 2010.
Regulatory Issues	Senate Bill 1010. DSL Removal-Fill law requires native woody species for revegetation. Endangered Species Act Consultation. OWEB and state agency grants for stream restoration projects must be consistent with restoration guidelines developed for the Oregon Plan.

- Related Actions**
- HAB-01 Characterize Riparian and Instream Habitat
 - HAB-02 Assess and Map Riparian and Wetland Habitat
 - HAB-04 Prioritize Floodplain/Lowland Protection and Enhancement Sites
 - HAB-09 Control Livestock Access to Streams
 - HAB-11 Encourage Protection and Enhancement on Private Lands
 - HAB-12 Sponsor Native Vegetation Planting Day
 - HAB-14 Ensure Minimum Streamflows
 - EDU-01 Develop and Implement an Oregon State University Extension Watershed Masters Series
 - WAQ-10 Implement Temperature Management Strategies
 - WAQ-01 Define, Implement, and Enforce Pollution Prevention and Control Measures on Agricultural Lands
 - WAQ-02 Implement Voluntary Farm Management Plans
 - WAQ-08 Ensure Adequate Urban Runoff Treatment and Retention
 - OPSW: ODF-5S, 7S
ODA-1
ODFW-IVB2

Gravel Quality and Availability in Tillamook Bay Watershed

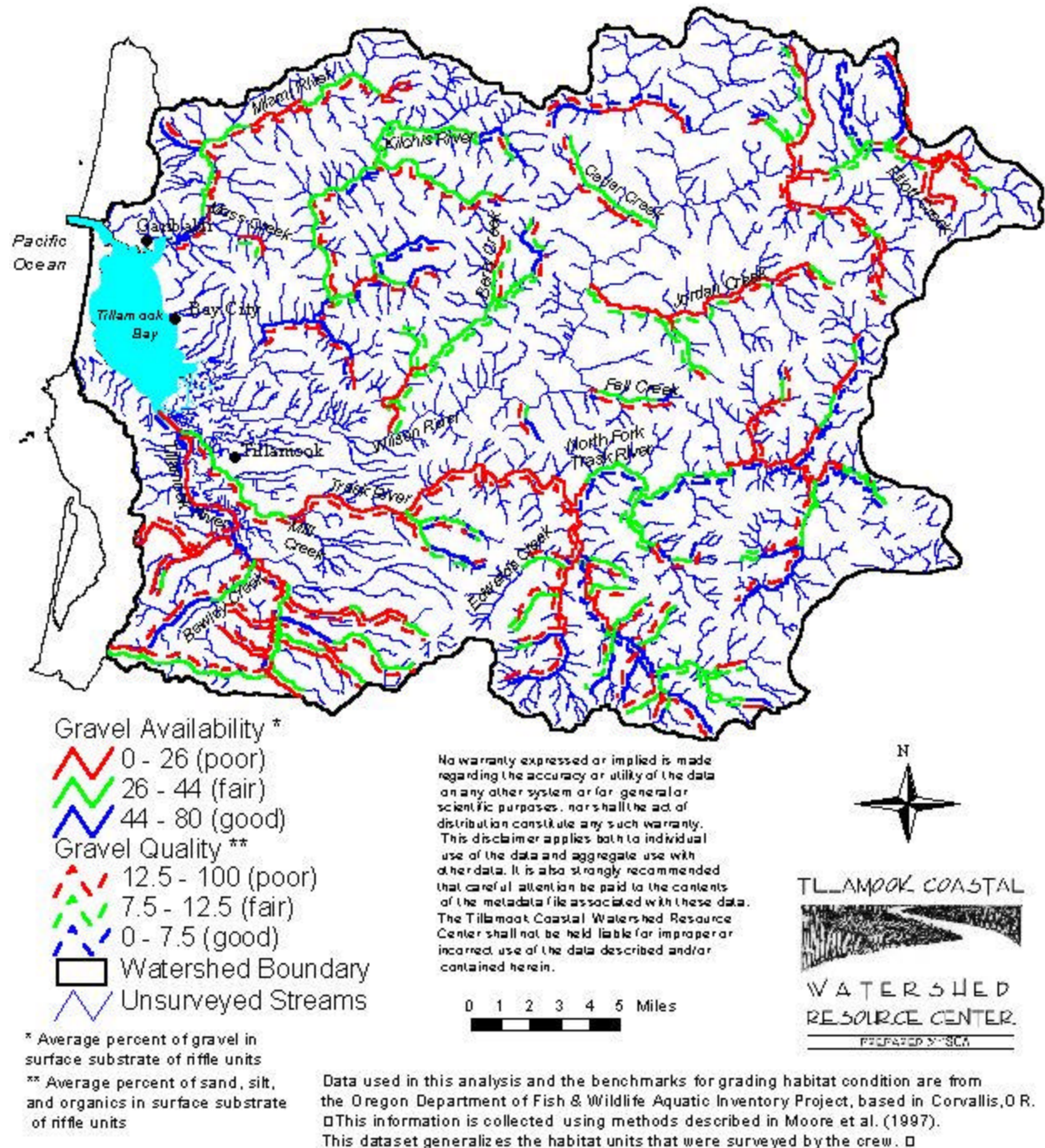
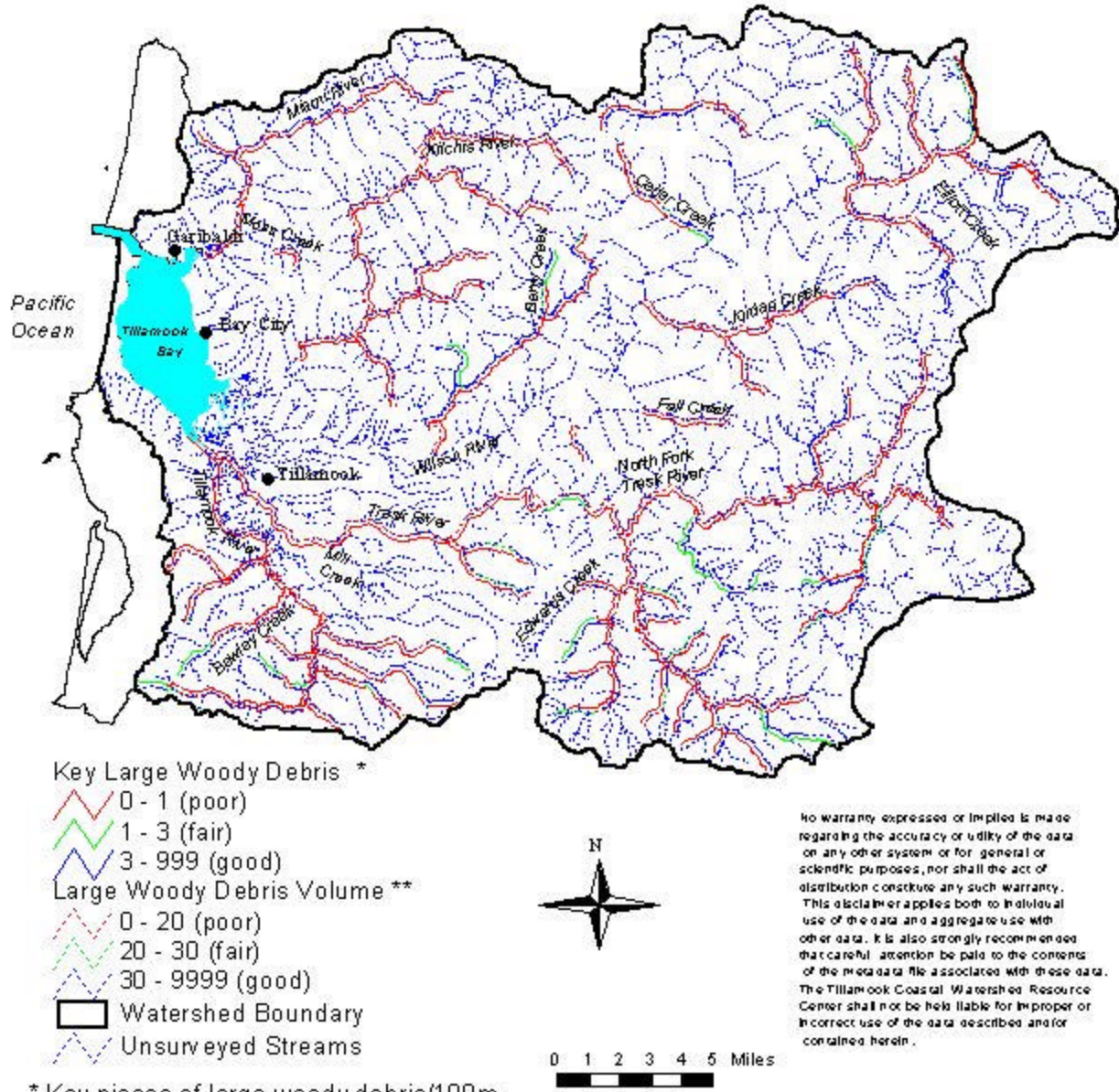


Figure 4-5.

Large Woody Debris in Tillamook Bay Watershed



No warranty expressed or implied is made regarding the accuracy or utility of the data on any other system or for general or scientific purposes, nor shall the act of distribution constitute any such warranty. This disclaimer applies both to individual use of the data and aggregate use with other data. It is also strongly recommended that careful attention be paid to the contents of the metadata file associated with these data. The Tillamook Coastal Watershed Resource Center shall not be held liable for improper or incorrect use of the data described and/or contained herein.

* Key pieces of large woody debris/100m of stream length.
 ** Volume of large woody debris/100meters of stream length.

Data used in this analysis and the benchmarks for grading habitat condition are from the Oregon Department of Fish & Wildlife Aquatic Inventory Project, based in Corvallis, O.R. This information is collected using methods described in Moore et al. (1997). This dataset generalizes the habitat units that were surveyed by the crew. □



Figure 4-6.

Pool Area and Frequency in Tillamook Bay Watershed

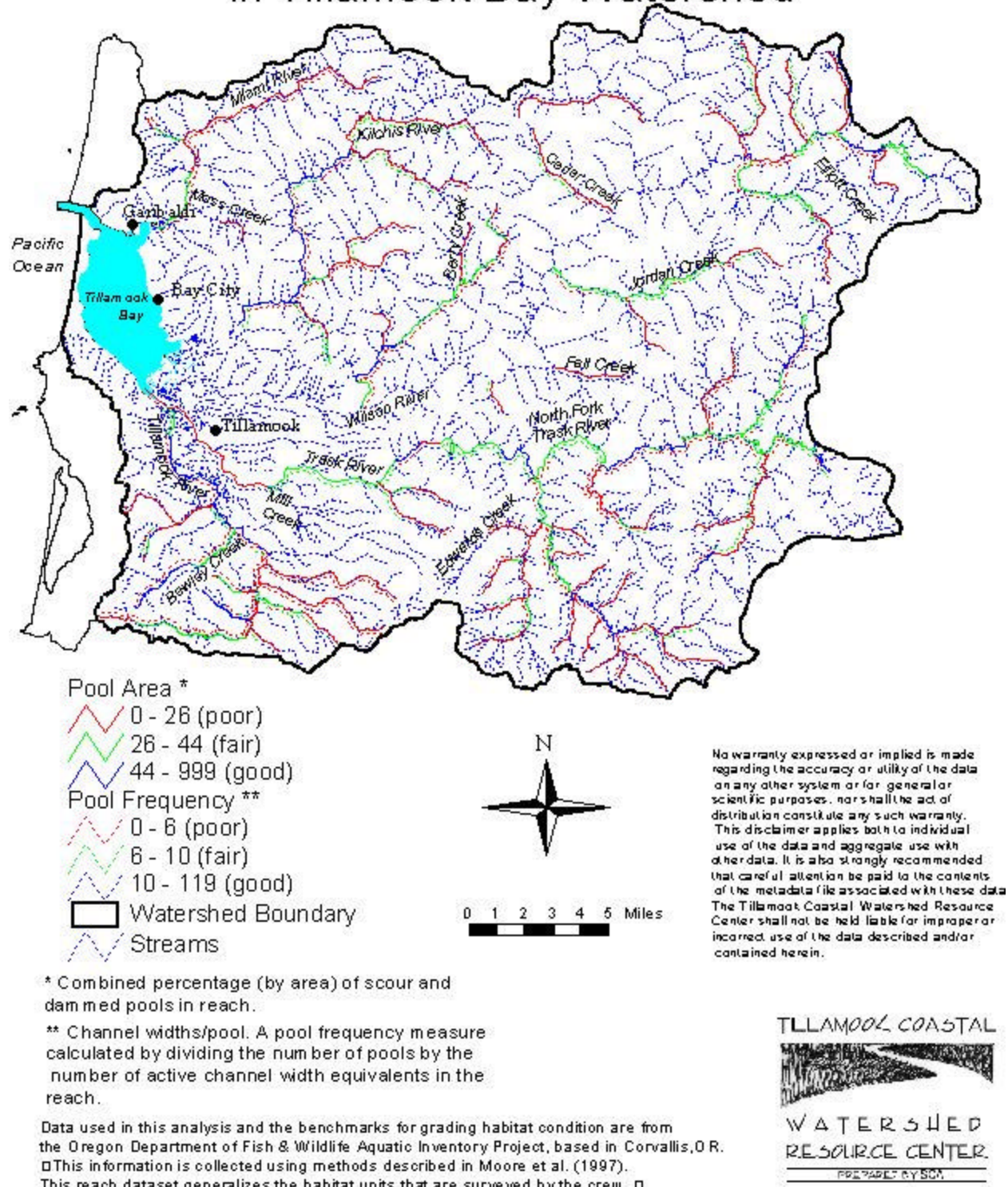


Figure 4-7.

HAB - 07

What

Protect and Enhance Instream Habitat

Protect and restore complex, properly functioning, productive instream habitat throughout the Watershed. Adopt or modify existing state laws or local ordinances to better regulate and minimize removal or relocation of stream gravels which may be existing or potential spawning habitat for anadromous salmonids. Assist with promoting the OPSW restoration guidelines. In selected, site-specific locations, add large wood, (root wads, logs, etc.), boulders, rock barbs, or other structures to improve channel habitat quality and productivity. Use ODFW habitat selection criteria⁷ to define high-priority enhancement sites. See HAB-01 and HAB-03. Encourage private landowners to place large wood in streams during forest operations as defined in the Oregon Plan. Enhance future large wood supplies by retaining in-unit leave trees (75% conifer), snags, and downed wood within and along Riparian Management Areas during forest harvest operations. See “OPSW Actions” in Appendix D.

Design projects to enhance habitat attributes such as:

- salmonid spawning and rearing habitat,
- channel form,
- complexity,
- aquatic roughness,
- channel substrate, and
- fish passage.

Why

Rivers and streams are dynamic systems whose beds and banks constantly change in response to hydraulic and erosive forces of water. These forces interact with basin geomorphology and riparian vegetation to form the instream conditions that determine the stream’s ability to support fish and other aquatic organisms. Instream management activities will improve the structural characteristics of streams in order to improve habitat productivity in the short term. Aquatic habitat will improve over the long term in response to improvements in riparian conditions.

How (Who.When.)

- Step 1* Revise local ordinances to increase protection of riparian areas and instream habitat. See HAB-15. (Tillamook County and city governments. 1999.)
- Step 2* Protect existing high quality instream habitat through voluntary agreements, land purchase, or easement. (Performance Partnership, OFIC, and OWJV. Ongoing.)
- Step 3* Review and maintain current list of key watersheds and aquatic diversity areas. See HAB-03 and Appendices E and F.

⁷ BLM and USFS lands are subject to the process discussed in their Land Management Plans, which are compatible with ODFW criteria.

	(Performance Partnership. 1999.)
<i>Step 4</i>	Update and expand list of priority sites, using ODFW guidelines. ⁸ (Performance Partnership. Ongoing.)
<i>Step 5</i>	Implement projects, using ODF/ODFW guidelines. ⁹ (ODF, ODFW, TBWC. Ongoing.)
<i>Step 6</i>	Monitor site for improvements. Consider DEQ macroinvertebrate surveys. (ODFW. Ongoing.)
Where	Watershed-wide.
Lead Agencies	Performance Partnership, Tillamook County, incorporated cities.
Other Partners	ODFW, ODF, DSL, DEQ, ODA, NRCS, SWCD, watershed councils, NMFS, USFWS, BLM, USFS, private landowners.
Anticipated Costs	\$10,000–\$50,000 per project; 100 projects in 10 years = \$1,000,000–5,000,000.
Monitoring	Coordinate with ODFW Aquatic Inventory Project Surveys. Track CCMP objective: <ul style="list-style-type: none">• Enhance 100 miles of upland instream habitat by 2010. OPSW tracking objectives for “instream roughness.”
Regulatory Issues	DSL Removal Fill Law. Endangered Species Act Consultation. OWEB and state agency grants for stream restoration projects must be consistent with restoration guidelines developed for the Oregon Plan.
Related Actions	HAB-01 Characterize Riparian and Instream Habitat HAB-03 Prioritize Upland Protection and Enhancement Sites HAB-04 Prioritize Floodplain/Lowland Protection and Enhancement Sites HAB-10 Stabilize Streambanks Using Alternatives to Riprap HAB-15 Revise Local Ordinances to Increase Protection of Riparian Areas, Wetlands, and Instream Habitat SED-02 Implement Practices That Will Improve Sediment Storage and Routing OPSW: DOGAMI-1, 4, C-1 DSL-1, 2, 3, 4, 9, 10, 12, 13, 26, 27 ODF-5S, 11S, 21S, 30S, 31S, 33S, 34S, 35S, 55S, 58S, 61S ODFW-IB3, IVA5, IVB2, IVB3, IVC1, IVC2, IVC4, IVC5, IVC6 ODOT-1, 7, OPRD-1, 2, WRD-S-1, 22, DEQ-4S

⁸ Thom and Moore, 1997. North Coast Stream Project Guide to Restoration Site Selection, Phase II. See list, Appendix G of this report.

⁹ ODF/ODFW, 1995. A Guide to Placing Large Wood in Streams.

HAB - 08**Protect and Enhance Freshwater Wetland Habitat****What**

Protect existing high quality wetlands through regulations, easements, or outright purchase. The County will update a list of significant wetlands for protection. Enhance wetlands in selected upland and floodplain areas. Develop and implement plans for constructed wetlands on agricultural lands. Design agricultural wetlands to filter surface flows, store floodwaters, and provide off-channel habitat for salmonids pursuant to ODA approval of constructed wetlands for runoff treatment. Protect and/or enhance significant wetland sites that contain, provide, or are designated as:

- within the 100-year floodplain;
- sensitive, threatened, or endangered species;
- a Natural Heritage Site;
- an Uncommon Wetland Plant Community in Oregon (see Appendix G of the Oregon Freshwater Wetland Assessment Methodology, OFWAM);
- Essential Fish Habitat as established in Amendment 14 to the Pacific Coast Salmon Plan (National Marine Fisheries Service, 1998);
- a Significant Goal 5 or 17 Resource (see Oregon Department of Land Conservation and Development Goal 5 and 17 and their respective Administrative Rules);
- a bog, fen, wetgrass prairie, vernal pool, mature swamp, or other sensitive, rare, or irreplaceable wetland type;
- a state or federal Wild and/or Scenic Waterway (see Oregon State Parks Administrative Rules);
- Outstanding Resource Waters (Chapter 340 Division 41 Section 026(1)(a) (DENS);
- an existing stream or wetland mitigation or enhancement site;
- a reference site as applied in the Hydrogeomorphic (HGM) Wetland Assessments for Oregon;
- within a watershed with streams on the State 303(d) list; and
- mitigation benefits to reduce the effect of the discharge of contaminants identified under state or federal authorities (*e.g.* CERCLA).

Why

Wetlands provide key habitat for a wide range of species and provide valuable ecological functions to reduce flood impacts. They trap sediment, fertilizers, pathogens, chemicals, and metals before these contaminants reach streams and rivers. They also offer important connecting corridors for wildlife and provide food and refuge for many aquatic species including salmon. In these ways, wetlands provide important benefits for all four TBNEP priority problems: habitat, water quality, sedimentation, and flooding.

How (Who.When.)	<p><i>Step 1</i> Protect any known high quality wetlands through voluntary agreements, easements, or outright purchase. (Performance Partnership and OWJV. Ongoing.)</p> <p><i>Step 2</i> Update wetland inventory and identify high-priority projects for protection and enhancement. See HAB-02. (DSL and Tillamook County. 2000.)</p> <p><i>Step 3</i> Develop riparian, wetland, and water quality seminars for landowners and the public. Develop maps and brochures that describe projects planned or implemented. (Performance Partnership. By 2000.)</p> <p><i>Step 4</i> Implement selected wetland enhancement projects on relevant agricultural, forest, urban, and residential lands. (Performance Partnership, NRCS, SWCD, OWJV. Ongoing.)</p> <p><i>Step 5</i> Monitor baseline and changing conditions. Work with citizen volunteers and use photo monitoring when possible. Formal monitoring protocol should include measurements of hydrology, water quality, soil characteristics, vegetation characteristics, and fish and wildlife. (NRCS and SWCD. Ongoing.)</p>
Where	Watershed-wide.
Lead Agency	Performance Partnership.
Other Partners	DSL, ODFW, USFWS, NRCS, SWCD, North Coast Ecosystem Workforce Initiative, watershed councils, Oregon Wetlands Joint Venture.
Anticipated Costs	Created wetlands: engineering - \$5-25,000 per project; construction - \$5-50,000/project; plus land purchase and easement costs. Protection projects: land/easement purchase or rental costs Monitoring costs Seminar costs
Monitoring	NRCS and SWCD will monitor wetland protection and enhancement on agricultural lands; ODF on forest lands; Tillamook County and incorporated cities on residential lands. DSL will monitor through inventory and permitting processes. Track CCMP objective: <ul style="list-style-type: none">• Enhance 100 acres of freshwater wetland by 2010.
Regulatory Issues	DSL Removal-Fill Law. SB 1010 Agricultural Water Quality Management Area Plan. Forest Practices Act of 1971, as amended. Endangered Species Act consultation.

Related Actions	HAB-02	Assess and Map Riparian and Wetland Habitat
	HAB-04	Prioritize Floodplain/Lowland Protection and Enhancement Sites
	HAB-11	Encourage Protection and Enhancement on Private Lands
	HAB-19	Protect and Enhance Tidal Marsh
	HAB-21	Modify Ineffective Tide Gates and Floodplain/Lowland Culverts
	HAB-24	Reconnect Sloughs and Rivers to Improve Water Flow
	OPSW:	DEQ-10S, 12s
		DSL-8, 16, 17, 18, 19
		ODF-28S
		ODFW-IVB2
		ODOT-15, 19

Wetlands in Tillamook Bay Watershed

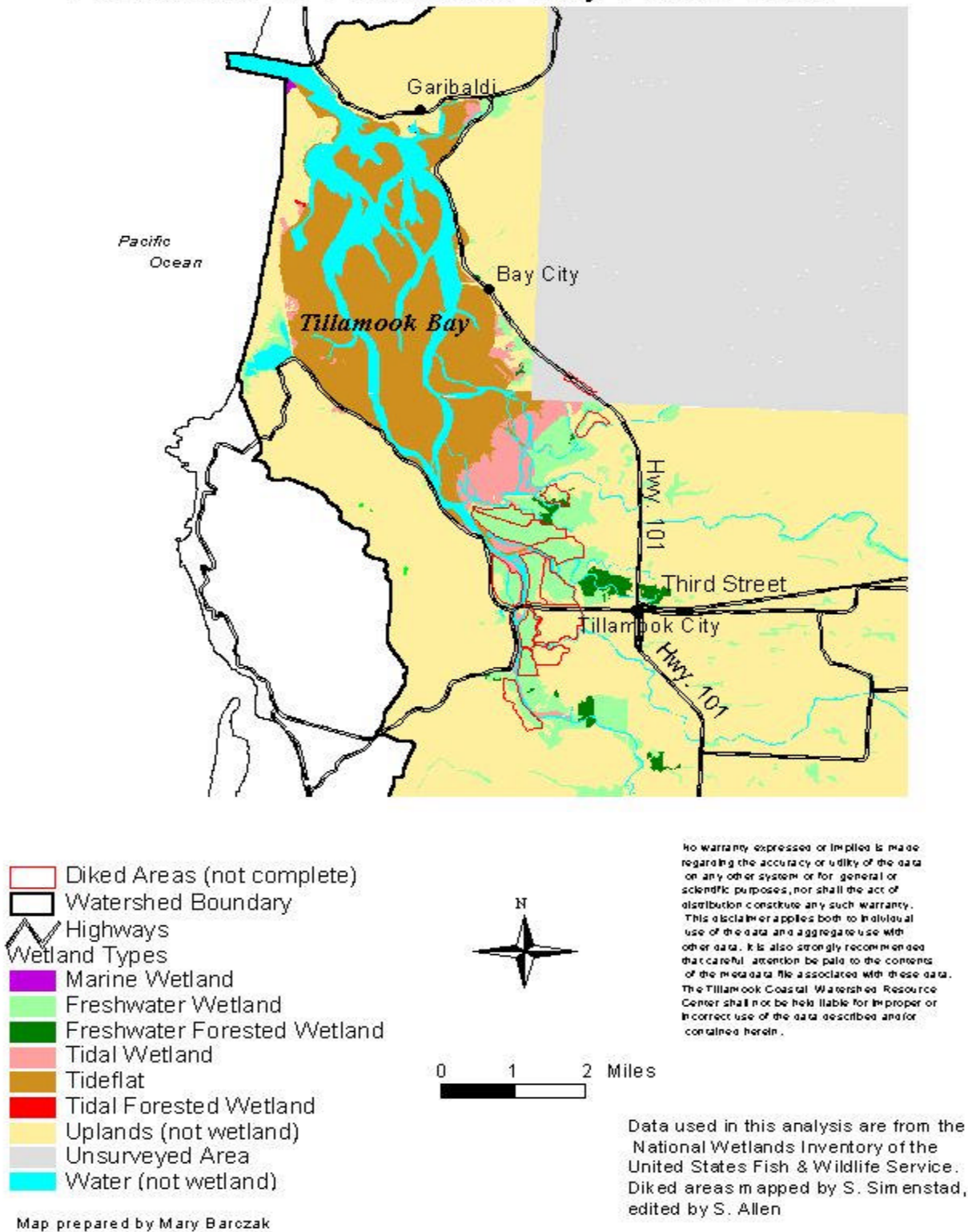


Figure 4-8.

HAB - 09**Control Livestock Access to Streams****What**

Install fencing along streams and rivers or implement appropriate measures to control livestock access to streams and riparian vegetation. Comply with agricultural pollution prevention and control measures (PCMs) specified by SB1010. Develop off-stream water sources for livestock where needed. Manage riparian vegetation whenever possible to achieve healthy riparian condition.

Why

Livestock access to streams leads to fecal contamination of the water, erosion of the streambank, and loss of riparian vegetation. Through fencing, providing off-stream water for livestock, and restoring riparian vegetation these livestock impacts will be minimized.

**How
(Who. When.)**

- Step 1* Continue/strengthen current fencing and planting programs. (SWCD/NRCS and TCCA. Ongoing.)
- Step 2* Continue education outreach on water quality to livestock owners. (OSU Extension Service, with input from ODA. Ongoing.)
- Step 3* Identify and prioritize new sites for fencing, planting, and off-stream watering. (SWCD and Performance Partnership. Ongoing.)
- Step 4* Implement all appropriate measures to control livestock access to streams to contribute to achieving water quality and riparian goals. Work with landowners to select sites and secure funds. Livestock access to streams controlled on at least 80% of priority riparian areas, identified in Step 3, by 2010. (SWCD, NRCS, and TCCA. Ongoing.)
- Step 5* Document and monitor fencing sites. Use photos to show changes. (SWCD, NRCS, and TCCA. Ongoing.)

Where

Livestock grazing areas throughout Watershed, mostly lowlands.

Lead Agencies

SWCD, NRCS, ODA.

Other Partners

Oregon State University (OSU) Extension, livestock owners, TCCA, ODFW, FSA, DEQ, Oregon Wetlands Joint Venture.

**Anticipated
Costs**

Construction costs per foot of riparian habitat average: \$1.45 for fencing, \$0.35–\$0.60 per foot for tree planting, \$0.32 per foot for water line and off-stream watering, \$0.12 per foot for design, and \$0.256–\$0.852 per foot for land costs. Costs dependent on width of buffer: 15' buffer = 900 acres; 50' buffer = 3,000 acres. (Source: SWCD). Total Costs: \$6,589,000–\$8,823,000.

Monitoring Coordinate with riparian aerial surveys and NRCS/SWCD field assessments.
Track CCMP objective:

- Achieve Senate Bill 1010 compliance among 100% of livestock operations by 2010.

Regulatory Issues ODA SB 1010 Plan.
Voluntary Water Quality Farm Plans.
County Ordinances.

Related Actions HAB-04 Prioritize Floodplain/Lowland Protection and Enhancement Sites
HAB-06 Protect and Enhance Lowland Riparian Vegetation
HAB-07 Protect and Enhance Instream Habitat
WAQ-01 Implement Agricultural Pollution Prevention and Control Measures
WAQ-02 Implement Voluntary Farm Management Plans
WAQ-10 Implement Temperature Management Strategies
OPSW: ODA1
ODF5S, 7S
ODFW-IVB2

HAB - 10**Stabilize Streambanks Using Alternatives to Riprap****What**

Plan new bank stabilization projects to minimize use of riprap. Use alternative methods where possible to stabilize banks; allow riprap only as a last alternative. Alternative stabilization methods include barbs, bioengineered bank stabilization, and native plantings. If riprap must be used, then develop and use techniques for riprap installation which provide interplanting with riparian vegetation and aquatic habitat (pools and riffles, small off-channel areas, etc.) in addition to controlling bank erosion.

In designating bank stabilization projects, consider alternatives in the following order (best alternative first):

1. Avoid stabilization and remove any at-risk structures;
2. Stabilize using only plant materials suitable to project location;
3. Stabilize using predominantly plant materials suitable to project location, but supplement with rock for additional necessary structural integrity, with appropriate mitigation;
4. Stabilize using predominantly rock for necessary structural integrity but supplement with plant materials suitable to project location, with appropriate mitigation; and
5. Stabilize using only rock for necessary structural integrity, while providing aquatic habitat with appropriate mitigation.

Why

Riprap is used as a site-specific erosion control technique. Most riprap-only installations severely limit riparian vegetation, and remove the connection between the riparian area and the water. Riprap can also result in increased bank erosion upstream or downstream of the site. Alternatives to riprap provide bank stabilization while retaining habitat and may be less expensive to install and maintain. Alternative stabilization methods must be determined on a site by site basis.

**How
(Who.When.)**

- Step 1* Plan projects on a site-specific basis in consultation with ODFW and NRCS/SWCD. Prioritize the projects based on erosion, sedimentation, habitat, and water quality values, and implement the highest priority projects first. (NRCS and SWCD, Performance Partnership. By 2000, ongoing.)
- Step 2* Deliver a riparian seminar series to landowners and interested members of the public. Develop maps, brochures, and signs for educational purposes. (Performance Partnership. By 2000.)
- Step 3* Monitor sites before and after bank stabilization projects. Use photos to document changes. (NRCS and SWCD. Ongoing.)

Where	Watershed-wide.
Lead Agency	SWCD and NRCS.
Other Partners	Performance Partnership, DSL, DEQ, Tillamook County Department of Community Development, watershed councils, landowners.
Anticipated Costs	\$10,000–\$50,000/project x 50 projects = \$500,000–\$2,500,000.
Monitoring	Coordinate with CCMP objectives: <ul style="list-style-type: none">• Enhance 100 miles of upland instream habitat by 2010.• Enhance 500 miles of riparian habitat in the floodplain/lowlands.
Regulatory Issues	Removal/Fill Law, ORS 196.800B 196.990. Department of State Lands OAR 141-085-005-141-085-0090. Tillamook County development permits. ODFW In-water work period.
Related Actions	HAB-03 Prioritize Upland Protection and Enhancement Sites HAB-04 Prioritize Floodplain/Lowland Protection and Enhancement Sites HAB-07 Protect and Enhance Instream Habitat OPSW: ODF-5S, 7S ODFW-IB3

HAB - 11 Encourage Protection and Enhancement on Private Lands

What Expand existing economic and tax incentives into new programs. Encourage private landowners to participate in habitat protection and enhancement through market-based incentives, conservation easements, cost-share programs, education, and technical assistance. Help landowners gain grants to support correction of high-priority fish passage barriers. Balance the value of the incentive with the actual benefit to society.

Current methods to assist and encourage private efforts in riparian areas include:

- purchase conservation easements on lands deemed important for their current or potential habitat value;
- expand cost-sharing programs;
- provide property tax incentives for lands not used for economic activity; and
- encourage protection and enhancement of freshwater and tidal wetlands through federal and state programs.

Why Sustainable conservation and enhancement activities should be linked to actual land values and lost production. Realistic incentives will encourage landowners and other stakeholders to participate in conservation projects. See HAB-13.

**How
(Who.When.)**

Step 1 Summarize and synthesize relevant information to help landowners meet or exceed environmental standards. Include information on stream-crossing standards for fish passage, and the importance of protecting and restoring riparian and wetland habitat. Provide information on easements, tax incentives, cost-share programs, and grants. Develop and deliver a riparian seminar to landowners and discuss conservation options. (ODF/ODFW. 2000.)

Step 2 Partner with private timber companies and Oregon Forest Industries Council (OFIC) to accept and implement Core Area Voluntary Management Measures contained in the Oregon Plan. (ODF and OFIC. 2000.)

Step 3 Support and implement federal and state conservation programs (SWCD, NRCS, ODF, DSL, and ODFW. Ongoing.) including:

- Wetlands Reserve Program (USDA);
- Conservation Reserve Program (USDA);
- Conservation Reserve Enhancement Program (USDA);
- Wildlife Habitat Incentives Program (WHIP) (USDA);
- Environmental Quality Incentive Program (EQIP) (State of Oregon, USDA);
- Partners for Wildlife (USFWS);
- Wetland Mitigation Banking Revolving Fund (DSL);

- Forest Incentives Program (ODF);
- Landowner Stewardship Award (ODF);
- Riparian Tax Incentive Program (ODFW);
- Stewardship Incentives Program (ODF).

Step 4 Purchase conservation easements on lands included on the prioritized conservation/enhancement list described in HAB-03 and HAB-04. Transfer the management of the easements and any purchased lands to a land trust with sufficient funds for management. (Performance Partnership and OWJV. Ongoing.)

Step 5 Review land taxes to consider tax incentives related to habitat protection and/or enhancement. (Tillamook County. 2000.)

Where Watershed-wide. Site-specific based on results from HAB-03 and HAB-04.

Lead Agencies SWCD, ODF, ODFW.

Other Partners NRCS, Tillamook County, ODFW, OSU Extension, watershed council, Conservation organizations, Oregon Wetlands Joint Venture, USFWS, OFIC, landowners.

Anticipated Costs 0.5 FTE TBPP staff time for one year = \$25,000.
Easement and land purchases.
Tax incentives.

Monitoring Implementation monitoring. Number and size of conservation/enhancement projects implemented.

Regulatory Issues Tax codes.
ESA Consultation.

Related Actions

- HAB-05 Protect and Enhance Upland Riparian Areas
- HAB-06 Protect and Enhance Lowland Riparian Vegetation
- HAB-07 Protect and Enhance Instream Habitat
- HAB-13 Increase Incentive Program Payments
- HAB-19 Protect and Enhance Tidal Marsh
- HAB-21 Remove or Modify Ineffective Tide Gates and Floodplain/Lowland Culverts
- WAQ-01 Define, Implement, and Enforce Pollution Prevention and Control Measures on Agricultural Lands
- CIT-06 Establish a Land Trust or Conservation Organization
- CIT-01 Implement an Oregon State University Extension Watershed Masters Series
- OPSW: ODA-1, ODF-5S, 7S, 8S, 30S, 31S, 55S, 56S, 58S, 60S
ODFW-IB3, IVA6, IVA7, IVB2, IVB3, IVB6
OMB-1, WRD-S-17, 29

HAB - 12 Sponsor a Native Vegetation Planting Day

What	There have been many riparian planting efforts throughout the Watershed, some of which have involved school or community groups. The various forest management agencies, along with the TBNEP, will establish a Watershed-wide riparian planting day. Agencies currently involved in riparian planting will work with the watershed councils to plan the events and provide trees for planting.
Why	Broad community involvement in riparian planting projects increases community pride, fosters a sense of stewardship in the participating public, and gives land owners the inspiration, knowledge, and help to plant trees on their land. Well-publicized, organized tree planting projects can plant thousands of trees in a short time at minimal cost.
How (Who.When.)	<p><i>Step 1</i> Plan specific riparian, wetland or other natural area planting projects with public involvement in mind. Watershed councils will develop projects from information in their action plans, and SWCD is already working with riparian landowners to develop streambank enhancement projects. (Watershed councils and SWCD. Ongoing.)</p> <p><i>Step 2</i> Create and distribute a brochure on the propagation and planting of Coast Range native species. (TBWC. By 2000.)</p> <p><i>Step 3</i> Secure funding to purchase trees and minimal equipment (shovels, planting buckets). (TBWC and SWCD. Ongoing.)</p> <p><i>Step 4</i> Plan and implement at least two planting days per year and advertise this information through newspapers, radio, watershed council meetings, cable television, the Internet, and through outreach to service clubs (Kiwanis, Elks), schools, and youth groups, such as the Oregon Youth Conservation Corps (OYCC), Boy Scouts, and Girl Scouts. (TBWC. Ongoing.)</p> <p><i>Step 5</i> Implement planting projects using SWCD staff and watershed council volunteers to train citizen volunteers in planting techniques. (TBWC. Ongoing.)</p> <p><i>Step 6</i> Implement post-project monitoring. Identify volunteers, work with lead resource agencies to develop/train at least one volunteer monitoring team (volunteer and/or paid/stipend to watershed council) within the local community. Establish photo points to document changes. (TBWC. By 2000.)</p>
Where	Watershed-wide.

Lead Agencies	Watershed councils.
Other Partners	SWCD, civic groups such as Boy Scouts, school groups, ODF, Bureau of Land Management (BLM), USFS, commercial nurseries (donate culled plants).
Anticipated Costs	\$2,500 per year for trees, other plants, equipment. TBWC and agency staff time.
Monitoring	Track CCMP objectives: <ul style="list-style-type: none">• Enhance 200 miles of forested riparian habitat to healthy riparian condition by 2010.• Enhance 500 miles of riparian habitat in the 0–500' elevation band to healthy condition by 2010.• Enhance 100 acres of freshwater wetland by 2010.• Enhance 750 acres of tidal wetland by 2010.
Regulatory Issues	None.
Related Actions	HAB-05 Protect and Enhance Upland Riparian Areas HAB-06 Protect and Enhance Lowland Riparian Vegetation OPSW: ODFW-IVB2

HAB - 13**Increase Incentive Program Payments**

What	Increase the lease payments made through incentive programs such as (Conservation Reserve Enhancement Program (CREP), Environmental Quality Incentive Program (EQIP), Wildlife and Habitat Incentives Program (WHIP), and Wetlands Reserve Program (WRP) to bring them closer to the potential economic return of the land.
Why	Current USDA incentive programs pay lease rates for withdrawn lands that are far below the economic return that the land could provide if it was kept in production. Landowners are reluctant to lease their land to conservation programs if they can make more money by keeping it in production.
How (Who.When.)	<p><i>Step 1</i> Conduct an economic analysis of land use values, rents, and costs. Quantify benefits and costs of riparian enhancement. Determine fair market values for easements, rents, and purchases. (NRCS. By 2000.)</p> <p><i>Step 2</i> Communicate findings and recommendations to legislators, USDA and other program managers, and legislative staff for agencies and industry groups. Align program payments with actual land values. (Performance Partnership. By 2000.)</p> <p><i>Step 3</i> Identify additional non-federal funds to supplement land conservation payments. (Performance Partnership. Ongoing.)</p> <p><i>Step 4</i> Align conservation payments with actual land values and implement relevant programs, including but not limited to: (USDA. By 2002.)</p> <ul style="list-style-type: none"> • Conservation Reserve Enhancement Program (CREP); • Conservation Reserve Program (CRP); • Wildlife and Habitat Incentives Program (WHIP); • Environmental Quality Incentive Program (EQIP); and • Wetlands Reserve Program (WRP).
Where	Watershed-wide, up to 500 feet elevation.
Lead Agency	NRCS, FSA.
Other Partners	SWCD, dairy farmers, small landowners, OWEB, State of Oregon (CREP).
Anticipated Costs	<p>Cost to replace feed lost by taking pasture out of production: approximately \$1000/year/acre.</p> <p>Woodland cost: site-specific, dependent on current value of land and timber.</p> <p>Staff cost: NRCS 0.5 FTE=\$25,000.</p>

Regulatory Issues Modify federal allocation formula and available budget for programs.

Related Actions

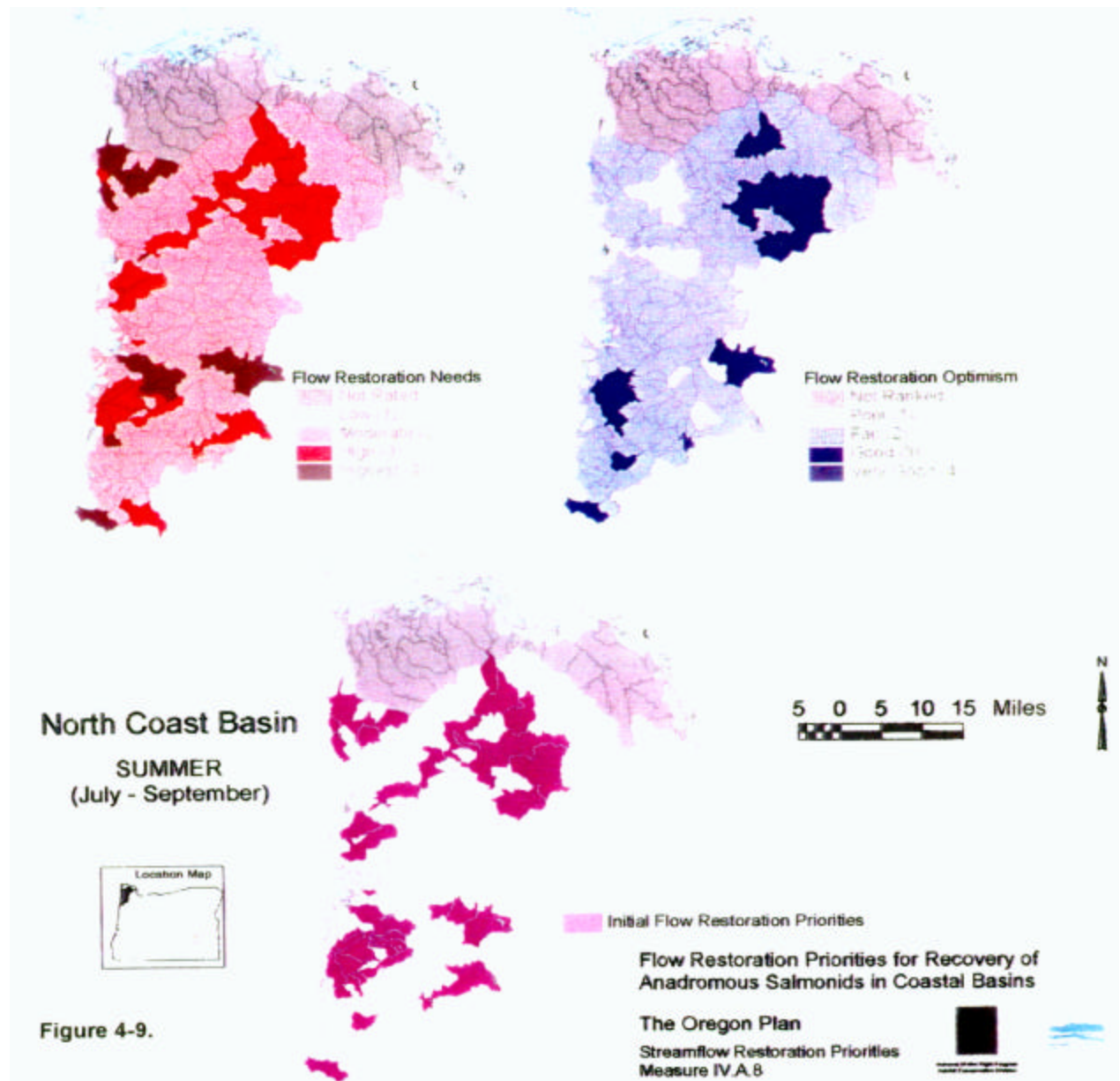
- HAB-11 Encourage Protection and Enhancement on Private Lands.
- SED-01 Implement Road Erosion and Risk Reduction Projects Practices
- SED-02 Implement Practices That Will Improve Sediment Storage and Routing
- OPSW: ODA-1
ODFW-IVB6

HAB - 14**Ensure Minimum Streamflows**

What	Ensure minimum habitat flows for high-priority streams. Locate and rectify unauthorized diversions and assure that authorized diversions are in compliance with their water withdrawal right or permit. Develop/implement conservation practices for agricultural and urban areas that increase the efficiency of water use. Where appropriate, purchase/lease water rights for instream flows. Oregon Water Resource Department (OWRD) will manage and certify Instream Water Rights (IWR) to protect streamflows.
Why	Salmonids require adequate water during low flow periods. Adequate water ensures thermal mass to prevent high temperatures. Salmonids also use intermittent streams as rearing areas during the rainy season. Minimum flows ensure adequate rearing habitat in the lowlands. Private individuals have protested many state applications for water rights.
How (Who.When.)	<p><i>Step 1</i> Identify high-priority streams for habitat and water quality (temperature) protection. (See HAB-03 and HAB-04.) (Performance Partnership. By 1999.)</p> <p><i>Step 2</i> Maintain and update OWRD/ODFW map of known water diversions. Share the map with Watershed Council and integrate it into GIS database. (OWRD/ODFW. By 2001.)</p> <p><i>Step 3</i> Locate unauthorized diversions and take corrective action. Halt all unauthorized diversions. (OWRD. By 2005.)</p> <p><i>Step 4</i> Purchase and/or lease instream water rights for high-priority streams. See map, Figure 4-9. (ODFW. Ongoing.)</p> <p><i>Step 5</i> Continue hydrology monitoring. Maintain minimum streamflows defined by the Oregon State Game Commission and Water Resources Department. (OWRD. Ongoing.)</p>
Where	Watershed-wide.
Lead Agency	OWRD.
Other Partners	ODFW, DEQ, Oregon Water Trust.
Anticipated Costs	Staff: OWRD - 0.5 FTE for five years = \$125,000. Instream water right purchases and leases.
Monitoring	<p>CCMP Monitoring Objective:</p> <ul style="list-style-type: none"> • Enhance 100 miles of upland instream habitat by 2010. • Reduce instream temperatures to meet salmonid requirements.

Regulatory Issues Total Maximum Daily Loads.
Related Actions WAQ-10 Implement Temperature Management Strategies
HAB-07 Protect and Enhance Instream Habitat
OPSW: DEQ-1S, 7S, 14S
ODF-14S
ODFW-IVA3, IVA8
WRD-S-1, 2, 4, 6, 8, 9, 10, 12, 13, 14, 15, 16, 17, 19, 20, 21,
22, 29

Flow Restoration Priorities



HAB-15 Revise Local Ordinances to Increase Protection of Riparian Areas, Wetlands, and Instream Habitat

What	Strengthen county and municipal ordinances protecting key habitat. Improve current ordinances by enhancing enforcement and public information, restricting uses permitted in key habitat areas, or by establishing or increasing buffer areas. Improve connection to and consistency with existing Federal and State laws, including the Forest Practices Act, the Removal-Fill Law, SB 1010, and SB 502, which gave primary authority to ODA to regulate farming practices for the purposes of protecting water quality. Improve consistency among County and incorporated cities' ordinances.
Why	<p>Current regulations and enforcement procedures do not effectively prevent degradation of key habitat features. More effective enforcement will aid accurate evaluation of existing regulations. However, improved understanding of the connectivity and sensitivity of these habitats suggests that larger buffers and a broader range of protected habitats are needed to maintain watershed functions and meet CCMP goals.</p> <p>Activities such as gravel removal, hardened river or stream crossings and extensive riprap bank stabilization can, and often do, have negative impacts on instream habitat. Features providing increased structure and diversity to the river channel and estuary, such as large wood, should be retained wherever possible.</p> <p>Improved regulations will aim to preserve habitat features providing stream shading, cover from predators, sediment and floodwater retention, and a healthy foodweb for plants, insects and fish.</p>
How (Who.When.)	<p><i>Step 1</i> The County will develop draft changes to its riparian, instream, and wetland protection ordinances for public review and input. (Tillamook County. By 2000.)</p> <p><i>Step 2</i> Adopt revised program for protection of riparian resources, significant wetlands and habitat, and in-stream habitat. (Tillamook County and municipalities. By 2002.).</p> <p><i>Step 3</i> Implement HAB-16 (Performance Partnership. By 2001.)</p>
Where	Watershed-wide on rural residential and urban lands (those not regulated by ODA or ODF).
Lead Agency	Tillamook County Commissioners and city councils of City of Tillamook, Bay City, and Garibaldi.

Other Partners	Performance Partnership, OSU Extension Service.
Anticipated Costs	0.5 FTE County staff time: \$25,000 per ordinance. City staff costs: .1 FTE each.
Regulatory Issues	Statewide Planning Goal 5: Natural Resources. Statewide Planning Goal 16: Estuarine Resources. Statewide Planning Goal 17: Shorelands. Removal-Fill Law (ORS 196.800-196.990). City and County ordinances. Rules for Issuance and Enforcement of Removal-Fill Permits (OAR 141-85-005 to OAR 141-85-660). SB 1010 Agricultural Water Quality Management Plans. SB 502 gives primary authority to ODA to regulate farming practices for the purposes of protecting water quality. Several laws limit the ability of local jurisdictions to regulate farm practices: <ul style="list-style-type: none">• ORS 561.191• ORS 30.930B937• PRS 215.253 Forest Practices Act gives authority to ODF on forest lands.
Related Actions	HAB-06 Protect and Enhance Lowland Riparian Areas HAB-07 Protect and Enhance Instream Habitat HAB-08 Protect and Enhance Freshwater Wetland Habitat HAB-16 Effectively Enforce Laws and Regulations WAQ-08 Ensure Adequate Urban Runoff Treatment and Retention SED-06 Develop, Implement, and Enforce a Stormwater Management Ordinance OPSW: DEQ-10S DSL-1, 2, 8, 9, 10, 12, 13, 14, 16, 17, 18, 19, 26, 27, 33 DLCD-2 ODF-8S, 11S, 17S, 20S, 21S, 27S, 28S, 29S, 34S DOGAMI-1, 4, C1 ODFW-IVB2 WRD-S-7, 25

HAB-16 Effectively Enforce Laws and Regulations

What	Prevent habitat loss through effective enforcement of the existing county, state, and federal regulations. Effectively enforce regulation(s) regarding draining and filling of wetlands, and tree and vegetation removal in riparian areas. Educate the judiciary and public about these regulations, and the environmental impacts of violations, and strengthen the current penalties for violations. Increase the visibility of enforcement officials and state agency participation in enforcement programs. Develop an integrated enforcement network that includes staff and resources from regulatory and resource agencies and local governments.
Why	The protection of existing habitat is a high priority for the CCMP. Yet, the local and state agencies lack sufficient resources to adequately enforce land use regulations. Citizens need to better understand the negative impacts of certain actions on the ecosystem. County fines do not effectively prevent vegetation removal or promote replanting. State agencies with enforcement mandates are stretched too thin and often have inadequate local presence. Stationing additional state personnel in the County would allow each agency to more efficiently enforce its own regulations and mandates and to coordinate enforcement activities with other agencies.
How (Who.When.)	<p><i>Step 1</i> Organize a task force of enforcement agency representatives and citizens to review enforcement mandates, identify gaps, share information, and report suspected illegal actions. Develop an integrated enforcement network. (Performance Partnership. 2000.)</p> <p><i>Step 2</i> Pursue adding agency staff where enforcement gaps exist. (OSP, ODFW, ODA, DEQ, ODF, OWRD, DSL, NMFS. 2001.).</p> <p><i>Step 3</i> Educate local judiciary and the public about the importance of laws affecting wetland, riparian, and instream areas, and the costs and consequences of habitat loss and over-fishing. See HAB-15, HAB-27. (Performance Partnership. By 2000.)</p> <p><i>Step 4</i> Develop a Web page that outlines important land use laws and regulations, the citizen complaint process, and contact people or offices. Include information on how and where to fish legally and properly dispose of litter and body wastes. Update the Web page regularly. (Performance Partnership. By 2001.)</p>
Where	Watershed-wide.
Lead Agency	Performance Partnership.
Other Partners	Tillamook County Commissioners and Department of Community Development, city councils and planning commissions for City of Tillamook,

Bay City, and Garibaldi; Oregon State Police (OSP), ODA, ODF, BLM, USFS, DSL, ODFW, NMFS, schools, OSU Extension.

Anticipated Costs

1.0 FTE agency staff costs for one year = \$50,000.
0.25 FTE TCPP staff for one year = \$12,500.
Web page development (ODFW, TCWRC staff time): \$2,500.
Other public information efforts.

Regulatory Issues

Clean Water Act.
Senate Bill 1010.
County ordinances.
Endangered Species Act.
Fisheries laws.
Forest Practices Act.

Related Actions

HAB-15 Revise Local Ordinances to Increase Protection of Riparian Areas, Wetlands, and Instream Habitat
HAB-27 Effectively Enforce Fishing Regulations
SED-04 Ensure Sufficient Resources to Enforce Forest Practices Act
FLD-05 Regulate New Construction and Development in the Floodplain
CIT-01 Implement an Oregon State University Extension Watershed Masters Series
OPSW: ODF-10S, 20S, 21S, 27S, 28S
ODFW-IIID1S, IVA1, IVB2, IVC5
WRD-S-7, 25

HAB - 17 Characterize Estuarine and Tidal Habitats

What	Manage and update databases and map for estuarine habitats. Maintain a GIS database to support the estuarine monitoring program.
Why	Habitat protection and enhancement is essential to the recovery of depressed species. Loss of estuarine and tidal habitat are key factors in the decline of salmonids migrating to and from the ocean. Shellfish and other aquatic organisms depend on good water quality and suitable bottom conditions. Quality habitat often improves water quality and reduces erosion and sedimentation.
How (Who.When.)	<p><i>Step 1</i> Maintain GIS databases for:</p> <ul style="list-style-type: none"> • salmonid utilization of migration, spawning, and rearing habitats, especially tidal sloughs (ODFW. By 2002.); • water quality in Bay and sloughs (DEQ. Annually.); • eelgrass beds (Performance Partnership. 2002.); • benthic invertebrates, including burrowing shrimp and clams (Performance Partnership. By 2002.); • oyster leases (ODA. Ongoing.); • tidal wetlands (Tillamook County. By 2000.); • tide gates and culverts (Performance Partnership. 2002.); • Bay bathymetry (COE. 2002.); and • Bay substrate types. (Performance Partnership. 2002.) <p><i>Step 2</i> Identify and map high priority protection and enhancement sites. See HAB-18. (Performance Partnership. Annually.)</p> <p><i>Step 3</i> Integrate new habitat data from other studies, including information about fish, waterfowl, and human uses. (Performance Partnership. Ongoing.)</p>
Where	Estuary-wide, tidal areas, sloughs.
Lead Agencies	Performance Partnership.
Other Partners	ODFW, USFWS, ODA, NRCS, ODF, DEQ, Tillamook County, DSL.
Anticipated Costs	Staff time. 0.5FTE for 10 years = \$250,000.

Monitoring

Use data to track CCMP objectives:

- Enhance 750 acres of tidal wetland.
- Upgrade 50% of all tidegates by 2010.
- No net decline in eelgrass beds.
- Achieve water quality standards in the rivers and Bay by 2010.

**Regulatory
Issues**

Endangered Species Act.
Statewide Land Use Planning Goal 16.

Related Actions

HAB-01 Characterize Riparian and Instream Habitat
HAB-15 Revise Local Ordinances to Increase Protection of Riparian Areas,
Wetlands, and Instream Habitat
HAB-19 Protect and Enhance Tidal Marsh
HAB-20 Protect and Enhance Eelgrass Habitats
HAB-22 Enhance Large Wood in Estuary
HAB-23 Update the Estuary Plan
HAB-29 Implement Essential Fish Habitat Mandates
WAQ-12 Evaluate Shellfish Growing Area Classifications
OPSW : ODF-23S, 28S
DEQ-10S
DSL-8, 16

HAB - 18 **Prioritize Tidal Sites for Protection and Enhancement**

What	<p>Develop and maintain a prioritized list of habitat protection and enhancement projects in the estuary. Analyze relevant data and update the habitat prioritization list each year as part of the Performance Partnership budget cycle. Initial prioritization will focus on protecting and restoring rearing habitat in tidal sloughs and wetlands, now the weakest link in the coho and chum life cycles. Tidal protection and/or enhancement projects will focus on:</p> <ul style="list-style-type: none"> • existing high-quality sloughs with healthy riparian condition and frequent water exchange; • sloughs with potential for good tidal exchange (for fish access); • sloughs with tide gates and/or culverts blocking large areas of potential habitat; • wetlands connected to sloughs; and • rivers and sloughs with very poor water quality (bacteria, temperature, dissolved oxygen [DO], total suspended solids [TSS]). <p>High priorities for estuarine protection and/or enhancement include:</p> <ul style="list-style-type: none"> • eelgrass beds close to rearing habitat (upper Bay), • marginal agricultural land behind dikes in former tidal wetlands, • areas with large wood, • Bayocean Spit, and the Three Graces.
Why	A prioritized list of high priority protection and enhancement projects will streamline funding and coordinate all projects.
How (Who.When.)	<p><i>Step 1</i> Assemble relevant data and maps. See HAB-17. (ODFW and Performance Partnership. Annually.)</p> <p><i>Step 2</i> Convene task force to prioritize protection and enhancement opportunities. (DLCD and Performance Partnership. By 2000, annually.)</p> <p><i>Step 3</i> Discuss protection and enhancement opportunities with willing landowners. (NRCS/SWCD, DLCD, OWJV, TBWC. Ongoing.)</p> <p><i>Step 4</i> Submit task force recommendations to Stewardship Council. (Performance Partnership. By 2000, annually.)</p>
Where	Estuary-wide, tidal areas, sloughs.
Lead Agencies	Performance Partnership.

Other Partners ODFW, USFWS, NMFS, ODA, DSL, Tillamook County, NRCS.

Anticipated Costs Staff time: 0.25 FTE, \$12,500.

Monitoring Support CCMP objectives:

- Enhance 750 acres of tidal wetland by 2010.
- Upgrade 50% of tide gates by 2010.
- No net decline in eelgrass beds.
- Achieve water quality standards in the rivers and Bay by 2010.

Regulatory Issues Endangered Species Act.
Statewide Land Use Planning Goal 16.

Related Actions

- HAB-19 Protect and Enhance Tidal Marsh
- HAB-20 Protect and Enhance Eelgrass Habitats
- HAB-21 Modify Ineffective Tide gates and Floodplain/Lowland Culverts
- HAB-22 Enhance Large Wood in Estuary
- HAB-24 Reconnect Sloughs and Rivers to Improve Water Flow
- HAB-26 Prevent Introduction and Control Exotic Species
- FLD-04 Update Existing Floodplain Map
- OPSW : DSL-8, 16
DLCD-3

HAB - 19 Protect and Enhance Tidal Marsh

What Protect existing high-quality saltmarsh through ordinances, easements, and outright purchase, if necessary. Purchase land or obtain easements on marginal diked agricultural lands and subsequently breach dikes to enhance tidal marsh acreage. Protect and/or enhance newly accreted saltmarsh through acquisitions or easements.

Why Rearing habitat in the lowlands is one of the critical factors limiting salmonid production, particularly for coho salmon. Restoring off-channel rearing habitat in the tidal areas would increase salmonid productivity for the basin as a whole. Habitat for other aquatic dependent species would also be provided.

How
(Who.When.)

Step 1 Protect existing high-quality saltmarsh and newly accreted saltmarsh through stronger County ordinances. See HAB-23. (Tillamook County. 1999.)

Step 2 Prioritize a list of potential protection and enhancement sites based on ecological value and economic/social feasibility. See map and ranking table in Appendix I for diked areas assessed while developing scientific and technical prioritization criteria and process. (Performance Partnership. By 2000, annually.)

Initial site selection criteria¹⁰ include:

- **Wetland structure.** Length and complexity of historic and/or existing channel;
- **Salmonid utilization probability.** Length of stream reach upstream from the dike with good spawning, rearing, and or migration habitat for chum and coho;
- **Salmonid rearing landscape.** Shortest distance to nearest good habitat type; including low saltmarsh, high saltmarsh, and dense eelgrass;
- **Water quality indicators.** Measures of bacteria and other non-point source pollution; and
- **Enhancement feasibility.** Competing human uses of the area.

Step 3 Contact landowners in the optimal locations and determine which ones are interested in sale of land or easements. (Performance Partnership, SWCD, OWJV. Ongoing.)

¹⁰ Simenstad *et al.* 1999. *Assessment of Potential Dike-Breach Restoration of Estuarine Wetlands in Tillamook Bay, Oregon.* Prepared by Charles Simenstad and Blake Feist of the Wetland Ecosystem Team, School of Fisheries, University of Washington; Janet Morland of the Wetlands Office, Oregon Division of State Lands; and Philip B. Williams of Philip Williams and Associates for the Tillamook Bay National Estuary Project, Garibaldi, OR.

- Step 4* Purchase lands/easements and implement projects on high-priority sites. Enhance 750 acres of tidal marsh by 2010. (Performance Partnership, OWJV. Ongoing.)
- Step 5* Consider land trust options. Evaluate feasibility of creating local or regional land trust and make recommendations. See COM-01. (Performance Partnership. 2000.)
- Step 6* Begin post-project monitoring plan. Work with citizen volunteers and use photo documentation to show changes at enhancement sites. Update County wetland maps. See HAB-01. (Tillamook County. 2000.)

Where	Estuary-wide. See Appendix I for prioritization study list.
Lead Agencies	Performance Partnership and the Oregon Wetlands Joint Venture (OWJV).
Other Partners	ODFW, USFWS, DLCD, DSL, Tillamook County, ODA, watershed councils, NRCS.
Anticipated Costs	\$4,000/acre for 750 acres = \$3,000,000.
Monitoring	Track CCMP objective: <ul style="list-style-type: none"> • Enhance 750 acres of tidal wetland by 2010.
Regulatory Issues	Clean Water Act. Endangered Species Act. State Removal/Fill law, ORS 196.800B196.990. ORS 274.085 provides that purchases of land, whether submerged, submersible, or formerly submerged/submersible, require a determination by the State Land Board. Department of State Lands OAR 141-085-005B141-085-0090. ODFW In-water Work Period.
Related Actions	HAB-17 Characterize Estuarine and Tidal Habitats HAB-21 Remove or Modify Ineffective Tide Gates and Floodplain/Lowland Culverts FLD-02 Implement Watershed Drainage Modification Projects CIT-06 Establish a Land Trust or Conservation Organization OPSW: ODFW-IVB2 DEQ-10S DLCD-3, DSL-8, 16

HAB - 20**Protect and Enhance Eelgrass Habitats****What**

Protect existing eelgrass beds for their value as an important habitat and food source for a variety of estuarine organisms. Encourage estuary users to avoid activities harmful to seagrasses. Monitor eelgrass abundance, distribution, and condition to document long-term changes. Evaluate intertidal and subtidal activities in eelgrass areas in response to new information.

Why

Eelgrass and other seagrasses provide valuable habitat for fish and other estuarine organisms. Eelgrass offers refuge and food sources for fish, shellfish, invertebrates, and birds. Activities associated with human use of the estuary, and degradation of water quality from sediments, nutrients, and turbidity negatively impact seagrass abundance.

**How
(Who.When.)**

- Step 1* Continue applied research into the interactions between eelgrass, oysters, and burrowing shrimp. See Chapter 10, Monitoring and Research Needs. Include shrimp control/eelgrass planting component in research plan. (Performance Partnership. Through 2002.)
- Step 2* ODA and other natural resource agencies will review research results and shellfish farming operations to determine the effect of farming activities on eelgrass. Apply research results to new intertidal and subtidal leases to minimize impacts on eelgrass beds. Report to Performance Partnership. (ODA. By 2002.)
- Step 3* Cooperate with the shellfish farming organizations to develop best management practices for shellfish farming operations. Recommend BMPs and report to Performance Partnership. (Performance Partnership and private growers. By 2000.)
- Step 4* Identify areas for possible eelgrass planting and/or burrowing shrimp control. See HAB-17 and HAB-25. (Performance Partnership. Annually.)
- Step 5* Monitor long-term changes in eelgrass beds. (Performance Partnership. Aerial flyovers by 2001 and 2006.)

Where

Estuary-wide, focusing on those areas where eelgrass currently grows. See shellfish management area map, Figure 2-5, in Chapter 2, State of the Bay.

Lead Agencies

ODA, Performance Partnership.

Other Partners

OSU Extension, ODFW, DSL, PCSGA and other shellfish growers' groups, Tillamook County, USFWS, and other members of the Oyster Interagency Workgroup, North Coast Ecosystem Workforce Initiative, watershed councils, COE, DSL, DLCDD, and Port of Garibaldi.

Anticipated Costs

Monitoring and research costs:
Ecological Interactions Among Eelgrass, Oysters and Burrowing Shrimp study - \$25,000 per year for 4 years = \$100,000.
MSS Imaging - \$30,000 every 5 years.

Monitoring

Track CCMP objectives:

- No net decline in eelgrass beds.
- Monitor oyster, eelgrass, and burrowing shrimp interactions.

Coordinate with monitoring programs:

- Ecological Interactions Among Eelgrass, Oysters, and Burrowing Shrimp.
- Submerged Aquatic Vegetation Survey

Regulatory Issues

ODA intertidal/subtidal leasing program.
To categorize areas where oyster harvest should be limited or excluded, Statewide Planning Goal 16 (Tillamook County, DLCD).
Endangered Species Act.

Related Actions

HAB-17 Characterize Estuarine and Tidal Habitats
HAB-25 Control Burrowing Shrimp Populations
HAB-26 Prevent Introduction and Control Exotic Species
WAQ-11 Implement Suspended Sediments Management Strategies
OPSW: ODFW-IVB2
DLCD-3

HAB - 21 Remove or Modify Ineffective Tide Gates and Culverts

What

Remove or upgrade tide gates on sloughs and drainage ditches and replace impassable culverts in floodplain, lowland, and other non-forested areas of the watershed. Prioritize enhancement sites based on the following criteria:

- fish access to valuable habitat,
- good water column exchange to maintain or improve water quality, and
- facilitating drainage during and after high water.

Remove or upgrade tide gates wherever practical and beneficial, based on potential habitat and water quality benefits and landowner willingness. Rely on voluntary approach with landowner education from SB 1010 planning process. Enable fish and other aquatic life movement through the tide gates when field inundation not a problem.

Provide information to landowners and city and county road departments about stream crossing standards for fish passage. When designing culvert repairs on non-forest and private roads, consider alternatives in the following order (best alternative first):

- Abandon dike or crossing and reestablish natural stream bed;
- Build a bridge designed to withstand 100-year flood;
- Construct bottomless arch culvert (designed to withstand 100-year flood);
- Install conventional culvert designed for effective fish passage and able to withstand 100-year flood;
- Fish-friendly tide gates.

Why

The Botkin Report¹¹ identified “impediment construction” as a major factor leading to the decline of salmonids in western Oregon. Of the 532 fish presence surveys ODFW conducted in the Oregon coastal basins during the 1995 survey season, 14.8% of the confirmed end of fish use was due to human barriers and road culverts made up the largest percentage of the barriers (96%). The Oregon Plan objectives include elimination of artificial obstructions to fish passage necessary to access key habitat for critical life stages of salmonids.

Culverts and (in the lowlands) tide gates often prevent migrating and foraging salmonids from accessing potential spawning, rearing, and winter habitat. Lost access has additional effects, such as loss of genetic diversity and loss of nutrients (from the carcasses of anadromous spawning adults) to upstream reaches. Human-caused barriers, especially tide gates, also hinder water

¹¹ Botkin, D., K. Cummins, T. Dunne, H. Regier, M. Sobel, and L. Talbot. 1995. *Status and future of salmon of western Oregon and northern California: Findings and options*. The Center for the Study of the Environment, Santa Barbara, California.

column exchange, thus limiting water and habitat quality. Juvenile salmonids, particularly Chinook and chum salmon, depend on freshwater and brackish tidal marshes during the first months of their lives. A network of tide gates throughout the basin's floodplain/lowlands prevents tidal flows from inundating pastures. Some of these tide gates are no longer utilized or are in poor repair, and some are causing problems by backing up water flow during high water events. Installing improved tide gates and redesigning culverts for fish passage or substituting bridges or bottomless arch culverts could ease both fish access and water quality problems. Landowner involvement and citizen monitoring save money, provide practical information, and foster support for research and for resource enhancement and management.

**How
(Who.When.)**

- Step 1* Maintain a GIS database of tide gates and culverts. Prioritize potential enhancement sites, based on habitat values and willing landowners. See "Tide Gate Database" in Appendix H. (Performance Partnership. Annually.)
- Step 2* Survey culverts and tide gates and identify potential habitat values to be enhanced by an upgrade. Identify fish presence and measure DO. (ODFW. 2000.)
- Step 3* Develop a seminar describing tide gate and culvert functions, locations, and fish benefits resulting from upgrade and/or modification. (Tillamook Bay Watershed Council. 2000.)
- Step 4* Implement tide gate and culvert projects. (Performance Partnership, SWCD. Ongoing.)
- Step 5* Monitor effectiveness. Use citizen volunteers to identify fish behind upgraded tide gates and culverts and measure DO. (TBWC. 2000.)

Where

Watershed-wide, up to 500 feet elevation. See Appendix H, Tide Gate Data Base, for tide gate habitat potential evaluation.

Lead Agencies

SWCD and Performance Partnership.

Other Partners

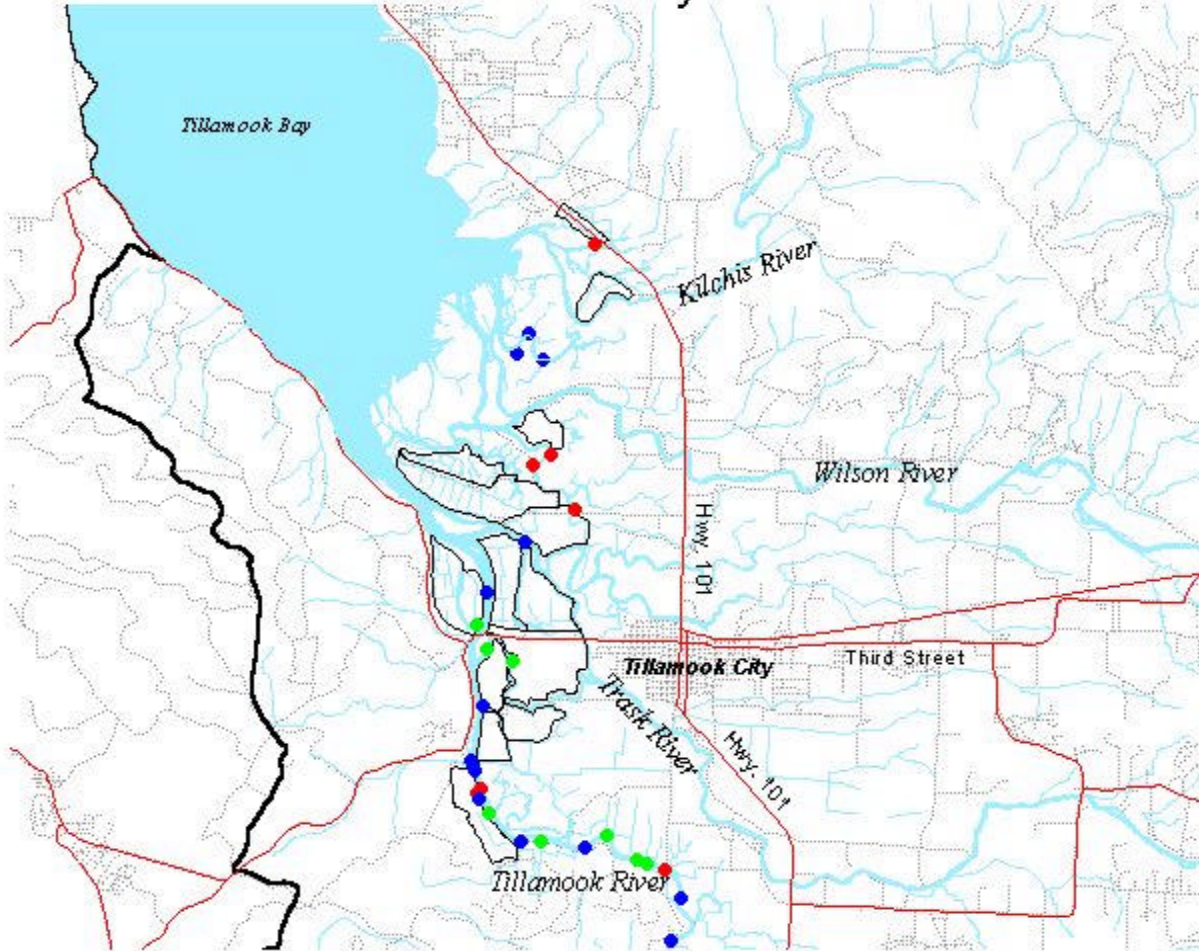
ODA, DSL, ODFW, ODOT, DEQ, Tillamook County, NRCS, watershed councils, diking districts, COE, Oregon Wetlands Joint Venture, OWEB, TCCA, landowners.

**Anticipated
Costs**

\$7,000 for each new tide gate including construction costs.
Target of 25 tide gates = \$175,000
Costs for culvert upgrades are site-specific.

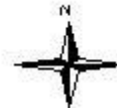
Monitoring	Citizen monitoring for fish presence and DO. Upgrade 50% of all tide gates by 2010. Monitor OPSW objectives, including: <ul style="list-style-type: none">• Remedy 15% of the significant human-created impediments to fish passage in coastal streams per biennium.
Regulatory Issues	SB 1010. DSL/COE Removal-Fill Permits. ODFW In-Water Work Period. Department of State Lands ORS 196.800-196.900 and OAR 141-085-005-141-085-0090.
Related Actions	HAB-07 Protect and Enhance Instream Habitat HAB-19 Protect and Enhance Tidal Marsh HAB-24 Reconnect Sloughs and Rivers to Improve Water Flow SED-01 Implement Road Erosion and Risk Reduction Projects SED-05 Reduce Sedimentation from Non Forest Management Roads FLD-02 Implement Watershed Drainage Modification Projects OPSW: ODFW-IVB2, IVC1 ODF-1S, 2S, 16S FHWA-1

Tide Gate Modification Potential to Improve Salmonid Habitat and Water Quality in Tillamook Bay Watershed



- Highways
- Tide Gate Modification Potential***
- Poor
- Fair
- Good
- Diked Areas (incomplete)
- Watershed Boundary
- Roads

No warranty expressed or implied is made regarding the accuracy or utility of the data on any other system or for general or scientific purposes, nor shall the act of distribution constitute any such warranty. This disclaimer applies both to individual use of the data and aggregate use with other data. It is also strongly recommended that careful attention be paid to the contents of the meta data file associated with these data. The Tillamook Coastal Watershed Resource Center shall not be held liable for improper or incorrect use of the data described and/or contained herein.



* Based on upstream salmonid habitat potential and tide gate condition. Data and analysis are from "Reconnaissance Survey of Tide Gates in Tillamook Bay Vicinity", by Jay Charland.

Prepared by Mary Barozak

Figure 4-10.

HAB - 22**Enhance Large Wood in the Estuary****What**

Increase the amount of large wood in the intertidal and subtidal areas of the Bay. Develop an ordinance to prevent or restrict the removal of wood from the Bay and surrounding shoreline by private citizens. Place large wood in the lower portions of rivers and in the Bay. Develop guidelines and criteria for wood placement in estuaries.

Why

Large wood is valuable habitat for many estuarine species, including Chinook and chum salmon, contributing to the base of the estuarine and near-shore food web and providing cover from predators for juvenile fish.

**How
Who.When.)**

- Step 1* Develop an ordinance to protect wood in estuaries and along shorelines. See HAB-15. (Tillamook County. By 2001.)
- Step 2* Develop criteria and guidelines for placing large wood in estuaries to improve salmonid habitat. (ODFW and DSL By 2000.)
- Step 3* Prioritize wood placement sites. See HAB-18. (ODFW and DSL. By 2001.)
- Step 4* Develop monitoring protocols and sampling procedures for estuarine fish abundance and distribution¹². Consider citizens and fishing guides as volunteer monitors. (ODFW. By 2002.)
- Step 5* Place large wood in selected habitats as pilot projects. For better fish refuge and to keep the structure in place, use whole trees with branches and root wads. Place 25 wood structures by 2005. (ODFW/ODF and DSL. Ongoing.)
- Step 6* Continue estuarine monitoring to determine effectiveness of placed large wood as fish habitat. (Performance Partnership and ODFW. By 2002.)

Where

Lower estuary.

Lead Agencies

Performance Partnership.

Other Partners

ODFW, DSL, DLCD, Tillamook County, Ports of Garibaldi and Tillamook, ODF, Tillamook Bay Watershed Council.

¹² See Ellis 1998. *Tillamook Bay Fish Use of the Estuary*. TBNEP.

Anticipated Costs

\$2,500 per project, 30 projects = \$75,000.

Monitoring

Track CCMP objective:
Achieve ODFW wild fish production and escapement goals by 2010.

Regulatory Issues

DSL Removal-Fill Permit
ODFW In-Water Work Period

Related Actions

- HAB-17 Characterize Estuarine and Tidal Habitats
- HAB-18 Prioritize Tidal Sites for Protection and Enhancement
- SED-02 Implement Practices That Will Improve Sediment Storage and Routing
- OPSW: ODFW-IVB2, IVA5
ODF-28S
DLCD-3

HAB - 23**Update the Estuary Plan and Zoning**

What	Update the Tillamook Bay Estuary Plan contained in the Tillamook County Comprehensive Plan, and update the zoning and coordinating agreements with the cities of Garibaldi, Bay City, and Tillamook, to reflect the changes.
Why	The current estuary management plan is based on data and concepts developed in the late 1970s. The TBNEP sci/tech program has assembled important new data and tools to use to improve the plan. Ongoing research, advances in our understanding of estuarine habitats, and the evolution of critical issues point to the need to update the Estuary Plan to meet current management challenges.
How (Who. When.)	<p><i>Step 1</i> Characterize estuarine and tidal habitats. Update bathymetry, and estuarine-use information on TCWRC GIS database. See HAB-17. (Tillamook County. By 2000.)</p> <p><i>Step 2</i> Prioritize estuarine sites for protection and enhancement. See HAB-18. (Performance Partnership. By 2001.)</p> <p><i>Step 3</i> Protect estuarine resources through review and revision of estuary zoning, development standards, and restoration and mitigation components of Estuary Plan based on Performance Partnership priorities developed according to HAB-18 and HAB-19. (Tillamook County. By 2002.)</p> <p><i>Step 4</i> Request Tillamook County to rezone Bayocean Spit from Recreation Management to Recreation Natural, and to craft a regulation (if necessary) to protect the Three Graces rocky intertidal zone. (Performance Partnership. By 2001.)</p>
Where	Estuary-wide.
Lead Agency	Tillamook County.
Other Partners	DLCD, ODFW, DSL, ODA, USFWS, NMFS, cities of Tillamook, Bay City, and Garibaldi.
Anticipated Costs	Staff time: Tillamook County - 0.5 FTE = \$25,000.
Monitoring	Institutional monitoring: Revised Comprehensive Plan Goal 16 Element by 2002.
Related Actions	<p>HAB-17 Characterize Estuarine and Tidal Habitats</p> <p>HAB-18 Prioritize Tidal Sites for Protection and Enhancement</p> <p>OPSW: None</p>

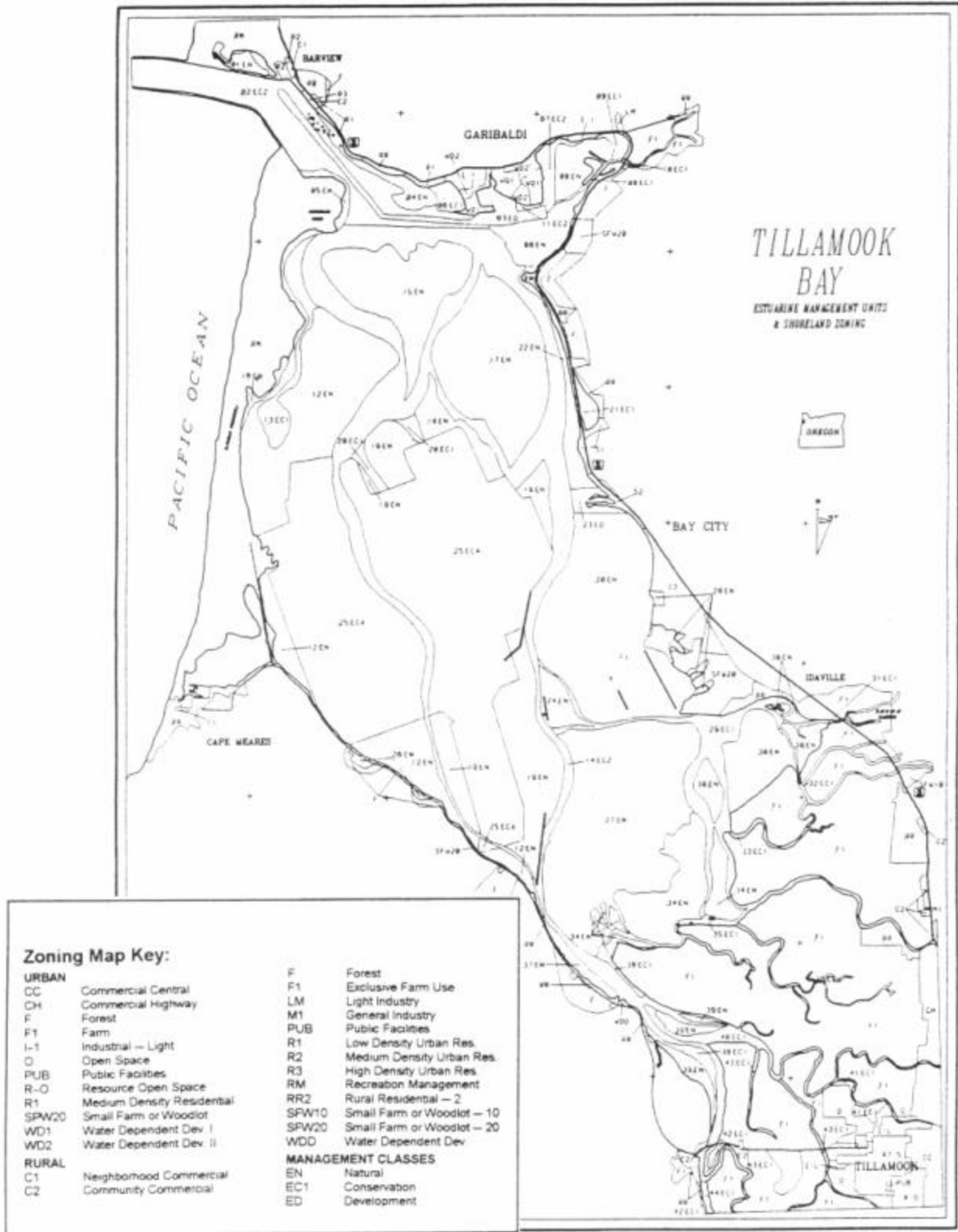


Figure 4-11. Map of current estuary zoning. (available in manuscript only)

Source: The Oregon Estuary Plan Book. 1987. Oregon Department of Land Conservation and Development.

HAB - 24 Reconnect Sloughs and Rivers to Improve Water Flow

What	<p>Reestablish hydrologic connections between sloughs and rivers and increase water flows through lowland sloughs, rivers, floodplain, and the estuary. Increase water exchange to improve dissolved oxygen and aquatic habitat. Consider appropriate digging, dredging, gravel removal, tide gate replacement, and/or streambank modification to improve flows and to reopen blocked or diked sloughs. Develop and use a computer model to predict the impacts of possible hydrologic modifications and to identify projects with the greatest benefits for water quality, fish access, and flood control. Monitor changes in water quality, fish use, and flood impacts.</p>
Why	<p>Fish and other aquatic organisms use sloughs, off-channel alcoves, and marsh areas for feeding, resting, and growing. To achieve optimal benefits, all aquatic habitats should be connected throughout the Watershed. Too often, gravel, silt, culverts, dikes or levees, tide gates, and/or other blockages restrict water flow. As a result, sloughs have poor water quality and limited fish access. In addition, blocked or disconnected sloughs and wetlands lose their ability to receive and slow flood waters and to distribute water more evenly throughout the lowland/floodplain. By opening up certain connections between sloughs, rivers, riparian wetlands, and the estuary, hydromodification projects can improve fish habitat while reducing flood impacts. However, due to the complex water flows through lowland areas and potential impacts to human life and property, all decisions should be based on state-of-the-art computer models and careful analysis.</p>
How (Who.When.)	<p><i>Step 1</i> Complete the COE feasibility study for flood control. Develop a hydrologic and hydraulic model for the Watershed. Simulate alternative flows and changes to the floodplain in response to hydrologic modifications. See FLD-01. (COE. By 2000.)</p> <p><i>Step 2</i> Select and conduct pilot projects to improve water movement and water column exchange on sloughs, which earlier had natural connections to main rivers. (FEMA and COE. By 2001.)</p> <p><i>Step 3</i> Monitor changes in hydrology, DO, and biological communities in reconnected sloughs and adjoining streams. (DEQ. Ongoing.)</p> <p><i>Step 4</i> Select and plan future projects. Prepare hydromodification plan for review by Performance Partnership. (Tillamook County and COE. By 2002.)</p> <p><i>Step 5</i> Reconnect, and/or otherwise modify river channels, sloughs, and/or other water bodies to improve water quality and floodplain hydrology. (COE and Tillamook County. 2003.)</p>

Where	Lowland floodplain rivers and sloughs.
Lead Agency	COE.
Other Partners	FEMA, DEQ, Tillamook County, DSL.
Anticipated Costs	Study costs: \$3,000,000 for COE hydrologic model and feasibility study. Implementation costs: \$250,000-2,000,000 per project.
Regulatory Issues	DSL Fill/Removal Law. Endangered Species Act consultation. ODFW in-water work window.
Monitoring	Track CCMP objectives: Meet water quality standards in rivers and the Bay by 2010. Complete 20 projects within the two years following adoption of hydrodynamic model which: <ul style="list-style-type: none">• measurably reduce runoff rate in the Watershed’s uplands (increase interflow and ground water recharge, thereby reducing stream temperatures and increasing summer flows);• improve drainage characteristics in the Watershed’s lowlands (<i>e.g.</i>, connect sloughs and rivers to reduce stagnation in sloughs);• increase floodplain storage capacity in the Watershed’s lowlands (<i>e.g.</i> setback levees create opportunity for sediment deposition and increased riparian area), and• improve the natural environment’s capacity to withstand or benefit from flood events.
Related Actions	HAB-04 Prioritize Floodplain/Lowland Protection and Enhancement Sites HAB-06 Protect and Enhance Lowland Riparian Areas HAB-21 Remove or Modify Ineffective Tide Gates and Floodplain/Lowland Culverts FLD-01 Develop a Hydrologic and Hydraulic Model FLD-02 Implement Watershed Drainage Modification Projects OPSW: ODFW-IVB2

HAB - 25**Control Burrowing Shrimp Populations**

What	Using appropriate control methods, reduce burrowing shrimp densities in selected areas where they are having a negative impact on the habitat and survival of other species.
Why	Burrowing shrimp can adversely impact eelgrass beds and other beneficial habitats in the Bay. They limit the overall productivity of the commercial shellfish industry and recreational shellfish production and harvest.
How (Who.When.)	<p><i>Step 1</i> Determine appropriate method to be used to control burrowing shrimp. (OSU Extension and shellfish farmers. Ongoing.)</p> <p><i>Step 2</i> Facilitate a seminar that addresses shrimp/oyster/eelgrass interactions, shrimp control methods, and estuarine ecology. Intended audience includes various estuary users, natural resource policy makers, and other interested citizens. (OSU Extension Service. By 2001.)</p> <p><i>Step 3</i> Plan, prioritize, and implement shrimp control projects for areas where shrimp are seriously impacting conditions for growth and survival of eelgrass, clams, oysters, and other benthic organisms. (Performance Partnership, DSL, DLCD. By 2001.)</p> <p><i>Step 4</i> Carry out post-control monitoring to measure effectiveness of any control measure. Work with volunteers and use photo monitoring when appropriate. (Performance Partnership, ODFW. 2001.)</p> <p><i>Step 5</i> Continue to investigate new control methods. (OSU Extension Service, shellfish farmers. Ongoing.)</p>
Where	Estuary areas where shrimp are seriously impacting conditions for growth and survival of eelgrass, clams, oysters, and other benthic organisms.
Lead Agency	Oregon State University (OSU) Extension Service.
Other Partners	ODFW, Tillamook County, ODA, DSL, oyster growers, commercial shrimp harvesters, recreational and commercial clam harvesters.
Anticipated Costs	Study costs: \$250,000 over four years.

Monitoring

Coordinate with:

- Burrowing shrimp/oyster/eelgrass study
- Aerial eelgrass survey every five years
- Benthic surveys.

Regulatory Issues

Incidental mortality of non-target species (ODFW).
Substrate alteration permits required (DSL).

Related Actions

HAB-20 Protect and Enhance Eelgrass Habitats
HAB-18 Prioritize Tidal Sites for Protection and Enhancement
HAB-29 Implement Essential Fish Habitat Mandates
OPSW: None

HAB - 26 Prevent Introduction and Control Exotic Species

What	Prevent introduction of and/or control invasive exotic species injurious to native populations and their habitat. These include but are not limited to: French and Scotch brooms (upland terrestrial); smooth cordgrass (<i>Spartina alterniflora</i>) and other <i>Spartina</i> species; purple loosestrife (emergent marsh); water milfoil (sloughs); and varnish clam (estuary and tidal marsh), green crab (<i>Carcinus maenus</i>), Chinese mitten crab; and zebra mussel (freshwater). Determine those non-native species most likely to be introduced to the Watershed and take precautionary measures to reduce the likelihood of their introduction.
Why	Exotic species can aggressively invade key habitat, displacing native species, altering the environment, and reducing habitat values. A 1996 survey of benthic invertebrates ¹³ found eight introduced or cryptogenic species. ODFW discovered green crabs in the Bay in the summer of 1997.
How (Who.When.)	<p><i>Step 1</i> Assemble a list of all invasive species known to be in the Tillamook Basin or expected to migrate into the area soon. Review their effects on native species and habitat values. (Performance Partnership. By 2000, updated annually.)</p> <p><i>Step 2</i> Develop a specific control plan for each high-risk species. (Performance Partnership. By 2001.)</p> <p><i>Step 3</i> Conduct a seminar that identifies important exotic species and reviews procedures to minimize their impact on the Watershed. (Performance Partnership. By 2001.)</p> <p><i>Step 4</i> Upon detection of a high-risk exotic species, implement the control plan. (ODFW, ODF, ODA. Ongoing.)</p>
Where	Watershed-wide.
Lead Agency	Tillamook County Performance Partnership.
Other Partners	ODFW, ODA, SWCD, OSU Extension Service, watershed councils, USFS, BLM, USFWS, public and private landowners.
Anticipated Costs	0.25 FTE agency staff time for five years = \$62,500. Weed control costs. Estuary users' costs of compliance with new controls.

¹³ Golden *et al.* 1998. *A Biological Inventory of Benthic Invertebrates in Tillamook Bay*. ODFW for TBNEP.

**Regulatory
Issues**

EPA regulations regarding herbicide or pesticide use.
County weed control ordinance.
Oregon noxious weed regulations, Chapter 570.
ORS penalties for improper application of pesticides.

Monitoring

Coordinate with:

- Benthic Invertebrate Inventory.
- Benthic Macroinvertebrate Monitoring (Rivers)
- Tidal Wetland Assessments.
- Riparian Assessment.

Related Actions

HAB-05 Protect and Enhance Upland Riparian Areas
HAB-06 Protect and Enhance Lowland Riparian Areas
HAB-08 Protect and Enhance Freshwater Wetland Habitat
HAB-19 Protect and Enhance Tidal Marsh
HAB-20 Protect and Enhance Eelgrass Habitats
OPSW: ODFW-IC4
ODF-12S, 29S

HAB - 27**Effectively Enforce Fishing Regulations**

What	Increase enforcement activities related to all fishery laws and regulations. Enforce existing fishery laws to protect salmon, steelhead and trout. Increase education efforts to better inform fishermen and shellfish harvesters of relevant regulations before they break those regulations.
Why	Violations of commercial and recreational fishery laws contribute to overharvesting problems and prevent assessment of the effectiveness of management actions. Current regulations have been established to promote a viable fishery while ensuring sustainable populations of current and future fishery stocks.
How (Who.When.)	<p><i>Step 1</i> Organize a coordinating group of enforcement agency representatives to share information with Oregon State Police (OSP) fish and wildlife troopers on suspected illegal actions regarding fisheries regulations. (OSP. By 1999.)</p> <p><i>Step 2</i> Secure additional funding for OSP so that adequate personnel are available to enforce fisheries regulations. (OSP. By 2001.)</p> <p><i>Step 3</i> Develop and implement a program that better educates the public. (ODFW. By 2002.)</p>
Where	Watershed-wide.
Lead Agencies	ODFW and OSP.
Other Partners	Tillamook County, Marine Board, US Coast Guard (USCG), TCWRC, ODA.
Anticipated Costs	Staff time: 1.0 FTE for five years = \$250,000. Web page: \$2,500.
Related Actions	HAB-16 Effectively Enforce Laws and Regulations OPSW: ODFW-IIID1S, IVA1 OMB3

HAB - 28 Evaluate Commercial and Sport Fishing Practices

What	<p>Evaluate the impact of commercial and sport fishing on stocks of salmonids and clams. Based on community input, consider limitations on season, gear, location, license fees, and/or target species. Investigate and encourage alternate gear to commercially target more abundant species such as tuna or mackerel. Evaluate various methods of reducing impacts of sport harvesting of salmonid species.</p> <p>Possible management options include:</p> <ul style="list-style-type: none"> • ban catch and release fishery for salmonids, • ban fishing in critical spawning areas, close certain river reaches to fishing, • restrict fishing for salmonids to the Bay during certain periods. <p>The ODFW could modify some fisheries practices on a trial basis and monitor the results.</p>
Why	<p>Mortality due to commercial and sport fishing is another factor in decline in fish populations. Changes in fishing rules may be required to enhance depleted salmonid stocks. Based on commission hearings and citizen input, ODFW revises estuary and sport angling regulations every four years. The ODFW reviews commercial fishing rules each year in the 0-3 mile zone, which includes estuaries. The PFMC reviews regulations in the 3-200 mile zone. ODFW will next revise sport angling regulations in 2001. The process will include public meetings in summer 2000 and a commission hearing in fall 2000. The process allows fishing rule changes for Tillamook Bay and its rivers. (ODFW. 2001.)</p>
How (Who.When.)	<p><i>Step 1</i> Establish a working group to evaluate current regulations and practices. Include stakeholders and the public. (TBWC. By 2000.)</p> <p><i>Step 2</i> The working group recommends changes in existing regulations and practices and outlines a monitoring plan. (TBWC. 2000.)</p> <p><i>Step 3</i> Submit the recommendations to ODFW commission for consideration. (TBWC. 2001.)</p>
Where	Watershed-wide.
Lead Agency	Tillamook Bay Watershed Council.
Other Partners	ODFW, Pacific Fisheries Management Council, fishermen's groups, fisheries service industries, professional guide groups, and other interested parties.

Anticipated Costs

Staff time: ODFW: 0.25 FTE for one year = \$12,500.

Regulatory Issues

NMFS consultation under the Endangered Species Act for activities that may adversely affect Essential Fish Habitat.

Monitoring

Achieve Oregon Department of Fish and Wildlife (ODFW) wild fish production and escapement goals by 2010.

Related Actions

- HAB-16 Effectively Enforce Laws and Regulations
- HAB-30 Support the Oregon Plan for Salmon and Watersheds
- OPSW: ODFW-III A2, III A3, IIC2S, IIB1S

HAB - 29**Implement Essential Fish Habitat Mandates**

What	Review and implement recommendations from the Pacific Fishery Management Council (PFMC) to identify Essential Fish Habitat, and Division of State Lands (DSL) to reduce adverse impacts and enhance Salmonid Fish Habitat. Adopt regional Essential Fish Habitat (EFH) standards and identify those areas designated to be EFH.
Why	The federal Magnuson-Stevens Fisheries Conservation Management Act requires the PFMC to identify activities that may result in adverse impacts to salmonid Essential Fish Habitat. The PFMC must also consult with those undertaking those types of activities in order to help them avoid or minimize impacts to that habitat and, where possible, to foster enhancement of degraded habitats. DSL is now defining Essential Salmonid Habitat for Pacific Northwest salmonids. In addition, DSL will revise general authorization (GA) rules for gravel removal and for removal and disposal of sediment behind tide gates.
How (Who. When.)	<p><i>Step 1</i> Review the recommendations from the PFMC regarding salmon Essential Fish Habitat in the Tillamook Basin. Identify Essential Fish Habitat in the Tillamook Bay Watershed. (Performance Partnership. By 2001.)</p> <p><i>Step 2</i> Integrate PFMC Essential Fish Habitat and DSL Essential Salmonid Habitat definitions into habitat prioritization process described in HAB-03, HAB-04, and HAB-17. (Performance Partnership. By 2001.)</p> <p><i>Step 3</i> Integrate Essential Fish Habitat parameters into the monitoring plan. (Performance Partnership. By 2001.)</p>
Lead Agency	Tillamook County Performance Partnership.
Other Partners	DSL, ODFW, Tillamook County, ODA, watershed councils, land owners and managers.
Anticipated Costs	Staff time: 0.25 FTE: \$12,500.
Monitoring	<p>Coordinate with monitoring programs:</p> <ul style="list-style-type: none"> • ODFW Aquatic Inventory Project surveys. • Submerged Aquatic Vegetation Survey. • Tidal Wetland Assessments. • Fish Use of the Estuary.

**Regulatory
Issues**

NMFS consultation under the Endangered Species Act for activities that may adversely affect Essential Fish Habitat.

Related Actions

- HAB-03 Prioritize Upland Protection and Enhancement Sites
- HAB-04 Prioritize Floodplain/Lowland Protection and Enhancement Sites
- HAB-05 Protect and Enhance Upland Riparian Areas
- HAB-06 Protect and Enhance Floodplain/Lowland Riparian Areas
- HAB-07 Protect and Enhance Instream Habitat
- HAB-08 Protect and Enhance Freshwater Wetland Habitat
- HAB-15 Revise Local Ordinances to Increase Protection of Riparian Areas, Wetlands, and Instream Habitat
- HAB-18 Prioritize Tidal Sites for Protection and Enhancement
- HAB-19 Protect and Enhance Tidal Marsh
- HAB-20 Protect and Enhance Eelgrass Habitats
- HAB-22 Enhance Large Wood in the Estuary
- HAB-26 Prevent Introduction and Control Exotic Species
- WAQ-12 Evaluate Shellfish Growing Area Classifications
- OPSW: ODFW-IVB2, IA1, IB1, IB2, IB3
ODF-16S, 24S, 25S, 32S, 57S
DSL-3, 4, 15, 31

HAB - 30 Support the Oregon Plan for Salmon and Watersheds

What Support the Oregon Plan for Salmon and Watersheds (OPSW) and integrate the CCMP implementation strategy into OPSW measures and programs. Support OPSW initiatives to restore natural fish production and monitor fish populations and their habitat. Implement OPSW recommend-actions regarding harvest, hatcheries, predation, and watershed councils.

Coordinate CCMP monitoring with OPSW state programs and integrate common methods and databases. Integrate state agency programs and OPSW actions into the CCMP action plan. See “OPSW Actions” as listed in Chapter 3, Management Framework, and cross-referenced in the Action Plans. For a comprehensive summary of applicable Steelhead Supplement Actions, see Appendix D.

Why The Oregon Plan seeks to empower the residents and industries of Oregon to restore their salmonid populations, promoting public stewardship of lands and involvement in natural resource decision making. This results in more sustainable use and direct benefits to the people who rely on the resources.

The State of Oregon developed the OPSW in response to declining salmon populations and a possible federal listing under the Endangered Species Act. The Tillamook Bay NEP began prior to the OPSW and followed a unique course in developing the CCMP. Although the OPSW and CCMP are organized differently, they share similar goals, objectives, and actions. Nonetheless, additional work remains to tightly integrate both plans into a cohesive whole.

How (Who.When.)

Step 1 Support the OPSW through letters of support and citizen and agency endorsements. Assist with promoting the OPSW restoration guidelines. (Performance Partnership. Ongoing.)

Step 2 Review agency commitments to the OPSW and align relevant actions with the CCMP. Work with agencies to refine agency commitments and budgets as needed. (Performance Partnership. By 2000.)

Step 3 Coordinate the CCMP monitoring strategy with standard OPSW assessments, surveys, and protocols. Use OPSW programs to maintain long-term monitoring in Tillamook Bay Watershed. (Performance Partnership. Ongoing.)

Step 4 Coordinate with agencies and other parties in implementation of the OPSW. (Performance Partnership. Ongoing.)

Where Watershed-wide.

Lead Agency	Performance Partnership.
Other Partners	Tillamook County, federal agencies, state agencies, watershed councils.
Anticipated Costs	Performance Partnership staff time - .5FTE for 10 years = \$250,000.
Monitoring	Achieve Oregon Department of Fish and Wildlife (ODFW) wild fish production and escapement goals by 2010.
Regulatory Issues	Endangered Species Act.
Related Actions	All actions in the CCMP and OPSW.